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San Francisco, California
1952

THE PAN-PACIFIC ENTOMOLOGIST

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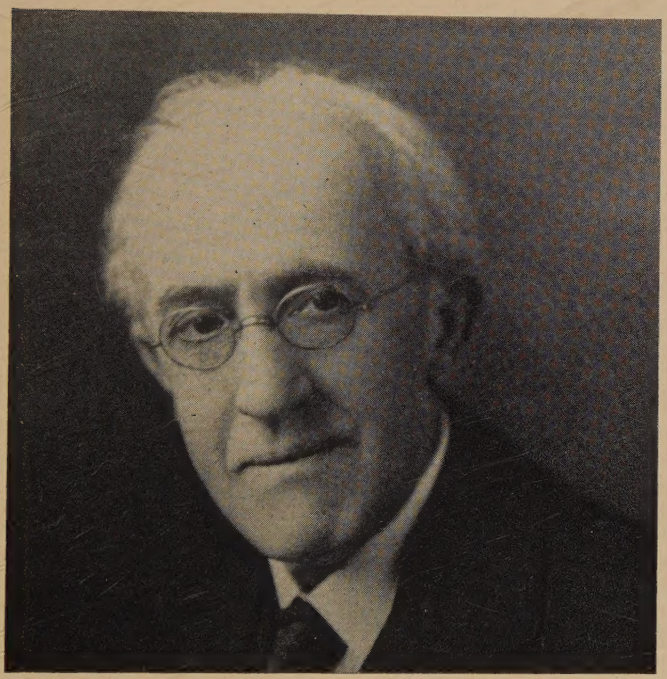
JAMES OTIS MARTIN



James Otis Martin, a member of the Pacific Coast Entomological Society since 1919 and its Secretary from 1928-35, passed away on October 15, 1951 at the home of his daughter, Mrs. Frederick J. Adams, in Austin, Texas. He was 81 years old and had been a resident of Austin for eight years since the death of his wife, Emily Ferry Martin, in Berkeley in 1943. Survivors include his daughter and a grandson, Robert Martin Adams of San Antonio, Texas. Funeral services were held in Austin and his ashes were buried beside those of his wife in Sunset View Cemetery, Berkeley, California.

J. O. Martin was born in Chicopee, Massachusetts, May 18, 1870, the son of William Henry and Silence Hoskins Martin. He

attended Chicopee High School and Mt. Herman School at Gill, Massachusetts. After spending three years as an apprentice in the Navy, he enrolled at Pratt Institute in Brooklyn where he studied mechanical drawing and machine design. He later attended Cornell University earning the B.S. and the M.S. degrees. At Cornell Mr. Martin was an assistant to Professor Ralph S. Tarr and made many of the photographs which were to serve as illustrations in the famous Tarr and McMurray geographies. His thesis problems in entomology involved the biologies of *Hydrometra martini* Kirkaldy and of *Silpha* and *Necrophorus*.

Martin's interest in insects was first aroused at the age of 12, when he was walking in a cemetery one Sunday afternoon and saw a man and boy turning over grave stones. Upon investigation he found that they were collecting bombardier beetles. The boy was Frederick Knab and the man, Knab's father. James Martin and Frederick Knab subsequently became good friends and made many collecting trips together. His intense interest in collecting beetles started at that time and was maintained throughout his life.

In the summer of 1896, Martin went to Greenland on an expedition sponsored by Cornell University and Massachusetts Institute of Technology. He had the interesting experience of travelling with Peary who was returning to Greenland for a 40 ton meteorite which he had been unable to bring out the previous year. The expedition was headed by Professor Ralph S. Tarr and, although the principal object was a geological study of Greenland, Martin had the assignment of collecting natural history materials, especially plants, insects and anthropological objects. He also acted as expedition photographer, operating with the greatest difficulty as he had to use a drygoods box as a dark room.

In 1913, Martin came to Pasadena, California. There he met H. C. Fall, who interested him in the myrmecophilous histerids of the genus *Hetaerius* and told him where to find them in the Arroyo Seco where the Rose Bowl is now located. Subsequently Martin published two valuable systematic papers on this genus and never missed an opportunity to collect additional specimens.

In 1918, he moved to Berkeley and availed himself of the opportunity of taking additional graduate work at the University of California. Under the direction of Professor E. C. Van Dyke while

attending the University, he made an important but unpublished study of the insect inhabitants of wood-rat *(Neotoma)* nests. Subsequently he lived in Berkeley until 1943.

Martin collected extensively in New England, Alabama, and southwestern United States. He was especially fond of the deserts of southern California, Arizona, New Mexico and Texas. He spent half a dozen summers collecting in these areas, one with E. P. Van Duzee, two with E. G. Linsley, the remainder alone[1]. The material collected on these trips was presented to the California Academy of Sciences and forms an important part of the collections from this region. He was a good companion in the field, a fine camper, good hiker, excellent cook and able to "take it" without complaining under difficult and trying conditions.

Throughout most of his life, entomology was an avocation with Martin. However, in 1924, he joined the staff of the Department of Entomology at the California Academy of Sciences as a preparator. He served in this capacity until 1932, when he retired from active entomological work. In later years he devoted much of his time to other hobbies, particularly stamp collecting, fishing, and the building of out-board motor boats.

Martin once recalled that Professor John Henry Comstock had a profound influence in shaping his life and interests as did H. C. Fall. He made a number of camping-collecting trips with Fall, who helped him with his identifications in the early days of his work in the West.

Martin's early collection of 12,000 specimens of meticulously prepared beetles, mostly from western North America, was presented to the California Academy of Sciences in 1928. It was especially rich in the less conspicuous and lesser known groups of Coleoptera.

Mr. Martin was especially fond of beginners who were in their first enthusiasm for entomology. He helped many by giving them equipment, insect boxes, and actually taking them on collecting trips. This was especially true of the writer who in high school and early college days made several field trips with him throughout

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[1]For notes concerning field activities of J. O. Martin, see Pan-Pac Ent. 2:47; 3:46,152; 4:48; 5:48, 192; and 18:46.

California, Arizona, New Mexico and Texas, much of the time wholly or partly at Martin's expense. Later, Martin presented him with a case of 50 Schmitt boxes, a label printing press, certain entomological books, a complete set of H. C. Fall's papers on the Coleoptera, and many other helpful entomological materials which he could not then afford to buy. Scattered throughout the country are biologists who could make similar statements concerning the generosity and encouragement offered by Mr. Martin.

The list of J. O. Martin's entomological writings is not long but it reflects to some extent the diversity of his taxonomic interests. However, he will long be remembered for the valuable collections which he made in the course of a long life and the encouragement and help which he gave to younger students of entomology.—E. G. LINSLEY.

ENTOMOLOGICAL WRITINGS OF J. O. MARTIN

1900. A study of Hydrometra lineata. Can. Ent., 32:70-76, pl. 3, figs. 7-8.

1917. In quest of Dinapate wrightii. Bull. Brooklyn Ent. Soc., 12:107-110, pl. 1.

1919. Notes on the occurrence of Schizax senex in California (Col., Cerambycidae). Ent. News, 30:231-232.

1920a. Notes on the genus Hetaerius and descriptions of three new species (Coleop.) Ent. News, 31:222-225, 245-248.

1920b. A new California Methia. Can. Ent., 52:215-216.

1922. Studies in the genus Hetaerius (Col. Histeridae). Ent. News, 33:272-277, 289-293.

1924a. Studies in the genus Mecas (Coleop.). Ent. News, 35:244-245.

1924b. Note on Hydnobius matthewsii Crotch (Col.:Silphidae). Ent. News, 35:255.

1927. A new Helmis (Coleoptera-Helmidae) from the Northwest. Pan-Pac. Ent. 4:68.

1928. A new Triarius from Arizona. Pan-Pac. Ent., 5:34.

1929. A new California Malachius (Coleoptera). Pan-Pac. Ent., 5:174.

1930a. Notes on the genus Diodyrhynchus Sch. with a description of a new species (Coleoptera). Pan-Pac. Ent., 6:129-130.

1930b. Two new coleopterous insects from Arizona. Pan-Pac. Ent., 7:70-72.

1931. A new Telegeusis from Arizona (Coleoptera). Pan-Pac. Ent., 8:91-92.

1932a. Amblycheila in California. Pan-Pac. Ent., 8:111.

1932b. A new California Epicauta (Coleoptera, Meloidae). Pan-Pac. Ent., 8:169-170.

1932c. Amblycheila schwarzi. Pan-Pac. Ent., 8:190.

1933. Notes on some longicorns from subtropical Texas (Coleop.:Cerambycidae). Ent. News, 44:178-183. (with E. G. Linsley).

INSECTS ASSOCIATED WITH SEQUOIA SEMPERVIRENS AND SEQUOIA GIGANTEA IN CALIFORNIA[1]

DONALD DELEON

Bureau of Entomology and Plant Quarantine,
Agricultural Research Administration,
U. S. Department of Agriculture

INTRODUCTION

Many people believe that the coast redwood *Sequoia sempervirens* (Lamb.) Endl. and the giant sequoia *Sequoia gigantea* (Lindl.) Decne are either remarkably resistant to insect feeding or are not fed upon at all. Such, however, does not seem to be the case. A good many insects breed in or on both species of *Sequoia.* There are insects that feed on the foliage, in the thick bark, in the phloem, and in the solid wood. It is true that, when compared with some of the other conifers, the number of species of insects attacking the sequoias is rather small. Just why this is so is not known. It may be that, since the sequoia is a tree left over from past geological ages, most of the insects for which it was originally a host have died out. It is more probable that, like the California nutmeg *Taxus brevifolia* Nuttall, the western yew *Tumion californicum* (Torrey) Green, and other species of plants, not many insects that feed on sequoias have developed.

Some people believe that the sequoias' supposed repellent or resistant properties are due to chemicals in the wood. Sherrard and Kurth (1933) have shown that there are extractives in the heartwood which prevent growth of certain fungi, but, so far as the writer is aware, no worker has shown that there is a chemical in the living portions of the tree—i.e., the sapwood, cambium, or leaves—which is repellent to insects.

The statement is often made that the sequoias' thick bark pro-

[1]The names preceded by an asterisk (*) are new host records. Original notes for several species, kindly furnished by E. G. Linsley, E C. Van Dyke, and Emanuel Fritz, of the University of California, and H. L. McKenzie, of the California State Bureau of Entomology and Plant Quarantine, are acknowledged under the insects concerned. The biological notes for the other species are from the files of the Forest Insect Laboratory, U. S. Bureau of Entomology and Plant Quarantine, Berkeley, California, and from the writer's notes, made when he was earlier employed by the National Park Service. Other assignments have prevented the completion of this paper, which was interrupted by the writer's entrance into the Army in 1942. Although the literature has not been searched since that date and the references consulted before that date have not been tied into the text, it seems advisable to make this information available to other workers as it is. F. P. Keen, in charge of the Forest Insect Laboratory at Berkeley, attended to the final details of this paper.

tects them from insect attacks, but some insects easily bore through the bark, and one species apparently is able to develop in the bark alone. Moreover, the bark on the upper portion of the bole and on the branches is thin, seldom being over 1/3 inch thick, and the bark on the lower portions of the bole is so deeply grooved on large trees that in many places the distance from the surface to living tissue is less than 1 inch. As soon as a tree is cut or a limb is broken, it is promptly and heavily attacked through the bark by insects which earlier made no attempt to attack it. Such evidence seems to indicate that a living tree is not attractive to these insects.

The supposed resistance of living trees to insect attack is commonly given as one of the chief reasons for the great age which sequoias attain. However, the western yew and the California nutmeg have fewer insects attacking them, and these two species are not known to live longer than 400 years. The real reason for the great age of the sequoias seems to be that the development of senescent cells in an individual tree is a matter of several hundred years, rather than of decades or shorter periods, as is the case for much plant life. Trees, like other organisms, have life spans that vary in different kinds. Some, such as digger pine and dogwood, are short-lived; others, such as the oaks and sequoias, are long-lived. Some kinds are more heavily beset by insects than other kinds; but, although insects may kill off more individuals of the former than of the latter, the life span of the species is not affected.

Except for several species of scales, all the insects discussed below are native. No other introduced insects are known to attack either species of sequoia. No attempt has been made to list the insects attacking either coast redwoods or giant sequoias that have been introduced into other parts of the world.

COAST REDWOOD INSECTS

Bark Beetles

The redwood bark beetle *Phloeosinus sequoiae* Hopkins is the most common insect attacking redwood throughout its range. The adult is about 4 mm. long, barrel-shaped, and very dark brown to nearly black. The wing covers of some individuals often remain a reddish brown. The larvae are curved, legless, and whitish, with light brown heads.

The beetles are attracted to weakened and recently felled trees and to injured or broken branches. The attacking beetle, which is

always the female, bores through the bark to the wood and there excavates a tunnel up the tree along the grain of the wood. Eggs are laid on each side of the gallery, and the larvae hatching from them mine out at right angles to the egg gallery. Pupation occurs either in the wood or in the bark. There is apparently little preference in regard to the size of the tree attacked. Trees 6 feet in diameter are infested as readily as limbs less than ½ inch in diameter. In the thick-barked portions the egg galleries are entirely in the bark; in small branches the egg galleries are entirely in the wood.

Winter is passed in the larval, new adult, and parent adult stages. Attacks are made through the warmer months of the year, but the main flight period appears to occur in May. There is considerable variation in the number of attacks per square foot. In one tree 22 inches in diameter the attacks averaged 17 per square foot, but they are usually fewer than this.

As mentioned above, the female beetle initiates the attack and only one pair of beetles is found in each gallery. The egg galleries average about 2⅝ inches in length. The shortest observed was 1 inch, the longest, 6 inches. Counts made in 11 galleries showed an average of 48 eggs per female. The maximum number observed was 171; the minimum, 36. The incubation period is not definitely known. The larvae require at least 2 months to complete development. There is considerable overlapping of broods, but observations indicate that there are two generations a year.

Thanasimus repandus Horn is a common predator of this beetle. A larva collected in October pupated by November 18 and transformed to an adult between December 1 and 17 of the same year. The adult is about 8 mm. long. The head, legs, and posterior half of the wing covers are black; the pronotum, base of the wing covers, and abdomen are red; a narrow band of white hairs separates the red from the black on the wing covers, and there is a wider band of white hairs across the wing covers near each tip. The predator seems to be restricted to this host, where it also feeds on *Dicentrus bluethneri* LeConte.

Lasconotus vegrandis Horn is fairly common in the egg galleries of the redwood bark beetle. The larvae probably prey on the eggs and young bark-beetle larvae. It is a slightly flattened reddish-brown beetle about 3 mm. long. Each wing cover bears six distinct ridges with a double row of coarse punctures between the ridges except

the outermost one. All the ridges are crested with silvery recumbent hairs.

The following parasites have been reared from limbs infested with the redwood bark beetle:

Heydenia unica Cook and Davis
Eurytoma phloeotribi Ashmead
Spathius sequoiae Ashmead
Ecphylus californicus Rohwer
Doryctes sp.
Rhopalicus sp.
Cecidostiba sp.

In the Hopkins (1903) description of *Phloesinus cupressi*, he mentioned having taken it from redwood. Blackman (1942) also reported a single lot taken from redwood in Alameda County. This beetle normally attacks only *Cupressus macrocarpa*.

**Cryphalus* probably *pubescens* Hopkins is the smallest beetle known to attack this tree, being scarcely 1 mm. long. It is very dark brown. It is found in small injured limbs or ones that have been recently broken off. The adults make small radiating galleries. Specimens have been taken in Muir Woods in March and near Rockport in October. In the literature it is recorded as breeding in *Abies*.

Ips latidens (LeConte) is a brownish, cylindrical beetle with three spines on the declivity. It is about 3 mm. long. The writer has examined a single specimen in the collection of the State Department of Agriculture at Sacramento, taken on May 10, 1934, from an ornamental redwood growing at Placerville, California. This species is most commonly found attacking digger and lodgepole pines.

Ambrosia Beetles

**Platypus wilsoni* Swaine is a dark-brown cylindrical beetle with a large head and pointed wing covers. It is about 5 mm. long. Professor Fritz obtained a dead specimen at Samoa, California, from finished lumber in which it had made extensive galleries. Whether it had been breeding in the logs in the field or whether this incidence was merely a case of abnormal attraction to green logs is not known. Normally this species breeds in *Abies*, *Pseudotsuga*, *Tsuga*, and *Picea*. In literature it is also recorded from *Libocedrus*, *Thuja*, and *Pinus*.

Gnathotrichus sulcatus (LeConte) is a slender dark brown cylindrical beetle about 3 mm. long, which commonly breeds in the sapwood of freshly cut stumps and logs. It excavates extensive galleries, which in cross section appear as pin holes, often with stain-

ing around the edges. Adults are found in flight all season long. Attacks generally occur only when the bark is present; consequently, they may be prevented by barking the tree as soon as it is felled. This species also attacks the giant sequoia *Pseudotsuga, Abies, Chamaecyparis, Tsuga, Picea,* and *Pinus.*

**Monarthrum scutellare* (LeConte) is a shiny dark-brown cylindrical beetle with its hind end "cut off" at an angle and with prominent teeth at the sides of the cut. It is about 4 mm. long. This beetle commonly attacks oak, but there is one record of its boring into a recently cut log near Garberville. Professor Fritz, who collected the specimens, states: "Piles of white frass were very numerous on tops of logs. First observed, April 26, 1934. Adults busy flying in numbers above the piles and ever so often one would enter a hole in the log." All other records show this species as breeding in hardwoods, chiefly *Quercus.*

Trypodendron cavifrons (Mannerheim) is reported by Kleine (1934) as having been taken from redwood, but this record is not verifiable. It is known to attack *Pinus, Picea, Alnus,* and *Betula.*

Powder-Post Beetles

**Habrobregmus gibbicollis* (LeConte) is a grayish-brown beetle about 4 mm. long, which commonly bores in the damp sapwood of trees that have been dead several years. The galleries of the grubs make a network of fine holes and the wood is reduced to a powdery condition. Larvae have been collected in October. All stages can probably be found at any time of year. This species is also known to feed extensively in *Pseudotsuga.*

**Ptilinus basalis* LeConte is a cylindrical brown beetle with a darker brown head and pronotum. It is about 4 mm. long. E. G. Linsley has identified adults collected by Professor Fritz near Garberville, California, from redwood siding. This beetle commonly attacks the wood of California laurel (*Umbellularia californica* [Hook & Arn.] Nuttall).

Cerambycid Beetles

**Ergates spiculatus* (LeConte) is the largest beetle attacking redwood and is often nearly 65 mm. long, but some specimens are only 40 mm. long. It is dark brown. The lateral margins of the pronotum bear many small spines, although some specimens almost lack these spines. Linsley collected a larva that was boring in the sapwood of redwood and also in *Abies.* Our records show that it commonly bores in *Pinus* and *Pseudotsuga.*

Prionus californicus Motschulsky is often slightly over 60 mm. long and is next to the largest beetle attacking redwood. It is dark brown, with three large spines on the lateral margins of the pronotum. E. C. Van Dyke told the writer that it breeds in redwood stumps, and that he obtained adults and larvae from the bases of redwood telephone poles. Damage, to have been caused by the larvae of this beetle, has been observed in seasoned burls from Los Gatos. Linsley also recorded it from redwood, *Abies*, and *Pinus*. Additional hosts given in literature for this species are *Pseudotsuga* and hardwoods, such as *Quercus* and *Alnus*.

Semanotus ligneus sequoiae Van Dyke is a beetle about 9 to 12 mm. long, with the base of the wing covers of most specimens reddish and the rest of the body nearly black. The tips of the wing covers of some specimens are blackish with a large black spot at about the middle of each wing cover. This beetle works between the wood and the bark of recently felled or fire-scorched trees. It takes about a year for a complete generation. New adults have been taken early in the spring from wood cut about a year earlier. Pupation takes place in the outer sapwood. This subspecies is known only from redwood.

Callidium sempervirens Linsley is a shiny purplish-green beetle about 9 to 12 mm. long. It has been reared in the Big Basin area from limbs cut about a year and a half earlier. Linsley, who described this species (1942) also obtained his specimens from the Big Basin area, where he found them infesting limbs. This beetle is only known to attack redwood.

Callidium pallidum Van Dyke is similar in shape and somewhat larger than the above-mentioned species. The males are brown and the females green. Specimens in the California Academy of Science have been reared from redwood stumps in San Mateo and Santa Cruz Counties. They were taken in December, January, and March. The species is only known to attack redwood.

Anoplodera impura (LeConte) is about 8 mm. long and has brown wing covers and a darker brown head and thorax. Van Dyke says he believes he has taken it from redwood stumps. Although it is called the redwood borer, there seems to be no authenticated record of its feeding in this host. In literature it is recorded as feeding normally in *Libocedrus*.

Anoplodera mathewsii (LeConte) has a reddish-brown head and pronotum, and yellowish-brown wing covers, each with a large

black spot at the tip. It is about 15 mm. long. Larvae, pupae, and new adults have been collected in the sapwood in May and June from fairly well-rotted old stumps. It is also reported in literature as feeding in *Thuja*.

Anoplodera crassipes (LeConte) is about 10 mm. long. The body is blackish, but the pronotum is covered with short golden hairs and the wing covers are brownish with three (male) or four (female) black bars extending across them. It is recorded by Doane *et al.* (1936) as feeding in redwood, *Pinus*, *Umbellularia*, and *Eucalyptus*.

Leptura obliterata Haldeman is a yellowish-brown beetle about 16 mm. long. The typical subspecies has been taken from redwood stumps and logs. Nothing is known about its life cycle in redwood; other known hosts for the species are *Pseudotsuga* and *Abies*, and in literature *Tsuga*, *Picea*, and *Pinus*.

Atimia dorsalis LeConte is a yellowish-brown beetle with the sides of the body lighter in color. It is about 10 mm. long. Van Dyke reported in conversation having reared it from redwood limbs. Linsley also has a record of it from this host and from *Thuja* and *Juniperus*. However, according to Linsley, the redwood records may possibly involve *A. maritima* Linsley. *A. dorsalis* likewise feeds in *Cupressus* and *Libocedrus*.

Phymatodes decussatus (LeConte) is recorded by Hopkins (1903) as having been reared from a small dead tree. Probably the species was wrongly identified, as it normally feeds in oak. The record probably refers to the following species which is superficially similar.

Phymatodes nitidus LeConte is a shiny blackish-brown beetle about 7 mm. long. It has been reared from the limbs of this host and there is one record, from the California State Department of Agriculture, of larvae believed to have been this species feeding in the cones. Our records show that it also feeds in the giant sequoia, and in *Cryptomeria*, *Cupressus*, *Libocedrus*, *Thuja*, and possibly *Abies*. In the literature it is also recorded from *Juniperus*.

Dicentrus bluethneri LeConte is the smallest cerambycid attacking the redwood. It is about 6 mm. long and is black with a wide interrupted reddish-brown band across the wing covers, which are also tipped with reddish brown. New adults have been taken near Willits in October in pupal cells in dry broken limbs, which had

apparently been broken off the preceding winter. It is also common in *Pseudotsuga,* and Linsley has a record of it from *Abies.*

Other Borers

Anthaxia aeneogaster Castlenau & Gory is a flattened bluish-black beetle about 6 mm. long. Van Dyke reported it as breeding in the sapwood of this tree. A larva belonging to this genus was taken from a limb infested with the cerambycid *Dicentrus bluethneri.* It also attacks the giant sequoia, *Cupressus, Libocedrus, Pinus, Pseudotsuga,* and various hardwoods.

**Serropalpus barbatus* (Schall) has been collected only in the larval stage, boring in the sapwood of a recently killed tree at Navarro. The larva is whitish, cylindrical, and about 20 mm. long. The adult is entirely brown and about 15 mm. long. Our records show that it also feeds in *Libocedrus* and *Abies.*

**Ctenicera* sp. near *rotundicollis* (Say) occurs commonly in the larval stage in the bark of trees about 10 inches d.b.h. near Willits. The larva confines its work to the inner bark, sometimes almost scoring the phloem. The specimens collected were about 8 mm. long with dark brown bodies and lighter brown heads. The urogomphi are bidentate with the inner tooth considerably smaller than the outer. Similar larvae were also collected near Klamath, California, under the bark of this tree.

Dromaeolus nitens Horn. Adults of this species have not been reared from this host, but the larval skins of what is believed to be this species are commonly taken from large galleries in the bark of living trees. In a green tree near Willits as many as 31 emergence holes have been observed in an area of about 10 square feet. Other similar larvae have been taken from cells in the bark. Larvae, which were apparently the same species, have been taken from the bark of the giant sequoia and from the sapwood of *Libocedrus.*

Ceruchus striatus LeConte is slightly flattened jet-black beetle with large jaws and strongly striate wing covers. The jaws of the male each bear a large upright tooth at about the middle of the inner upper margin; those of the female bear two smaller horizontal teeth on the inner upper margin. The beetles are about 13 mm. long. Doane *et al.* (1936) record it as living in the sapwood of dead trees. Linsley also has records of it in dead redwood limbs. In the literature it is recorded from fir, probably *Pseudotsuga.*

Scale Insects

The following scale insects and mealybugs are known to attack

redwood, whether growing under natural conditions or as ornamentals. As practically nothing is known about their biology or distribution in redwood, they are merely listed here.

Insect	*Authority for redwood as host*	*Other hosts given in literature*[1]
Armored scales definitely from redwood:		
Cryptaspidiotus shastae (Coleman)	Essig (1926)	*Cupressus, Juniperus.*
Aspidiotus hederae (Vallot)[2]	Coleman (1903)	*Umbellularia, Pinus, Taxus, and many more.*
Lindingaspis rossi (Maskell)[2]	*ibid.*	*Araucaria* and many others.
Armored scales possibly from redwood:		
Aonidiella aurantii (Maskell)	Calif. State Dept. of Agric. 1942	*Citrus* and many other deciduous hosts.
Hemiberlesia lantanae (Signoret)	*ibid.*	*Abies* (Coleman 1903).
Carulaspis visci (Schrank)[2]	*ibid.*	*Libocedrus, Pinus, Juniperus, Viscum Cupressus, Thuja.*
Phenacaspis pinifoliae (Fitch)	*ibid.*	*Pinus, Pseudotsuga, Tumion, Abies, Picea*
Diaspis carueli (Targioni)[2]	*ibid.*	*Thuja, Libocedrus, Cupressus, Juniperus.*
Lepidosaphes newsteadi (Sulc)[2]	*ibid.*	*Pinus.*
Saissetia nigra (Nietner)[2]	*ibid.*	Many tropical and sub-tropical plants, *Pinus.*
Mealybugs:		
Pseudococcus sequoiae (Coleman)	Coleman (1903)	*Cupressus.*
Pseudococcus ryani (Coquillett)	Essig (1926)	*Cupressus, Libocedrus, Thuja, Pinus, Araucaria.*
Puto cupressi (Coleman)	*ibid.*	*Pinus, Cupressus, Tumion.*
Pseudococcus citri (Risso)	*ibid.*	Wide variety of non-coniferous species.

[1]Most of the hosts have been obtained from Essig (1926) and Ferris (1937).
[2]Probably introduced.

Termites

Zootermopsis angusticollis (Hagan). Linsley has records of what appeared to be this species attacking redwood in contact with the ground near Los Gatos and Santa Cruz. Specimens that are either this species or *Z. nevadensis* (Hagen) have been taken from the sapwood of a scorched living tree near Navarro. These two species are so nearly similar that it is necessary to have soldiers to make a positive identification.

Reticulitermes hesperus Banks has been observed in the San Francisco Bay area, attacking redwood boards that have been in place in the soil less than five months.

Reticulitermes tibialis Banks. Linsley states that he has examined specimens from the bark of a living ornamental tree to which its activities were apparently entirely confined.

Kalotermes minor Hagen has been taken by Professor Fritz in the dead tops of green trees that had just been felled. Adults have also been taken in October at Navarro, where they had just begun to bore into the injured sapwood of a green tree. In addition, Linsley has records of this termite working in redwood rafters in a house at Santa Cruz, in redwood in a residence at San Simeon, and in the sapwood of dead branches at Big Sur.

Aphids

Amphorophoro morrisoni (Swain) is a green aphid which E. O. Essig states, in correspondence, has been taken several times from redwood. He says it "appears on it late in the fall where the sexual forms are developed and eggs are laid on the suckers. This insect also feeds on Monterey cypress and related plants."

Leaf-Feeding Beetles

Dichelonyx valida (Le Conte) is recorded by Essig (1926) as feeding on the leaves of this host. It is a greenish-black scarab about 16 mm. long. The adults are said to appear in April and May.

Moths

**Laspyresia* sp. A heavy infestation of small ivory-colored caterpillars was observed in July and August in the bark of a large living ornamental tree in the East Bay area, but no adults have been obtained. A pupa was observed on August 20. The caterpillars force out borings from their galleries in the shape of little pellets, which are webbed together. They feed both in the dry

bark and in the outer phloem, where the injury causes beads of amber-colored pitch to form.

Horntails

Sirex areolatus (Cresson). The females are metallic blue-black and about 32 mm. long. The males are smaller with the middle five segments of the abdomen brownish-red. The larvae are white, legless, and bear a short, sharp spine at the middle of the last body segment. The female is occasionally observed laying eggs in freshly cut and in fire-scorched trees. The work of the larva is confined to the sapwood, where it makes extensive galleries circular in cross section. Adults have been collected during August in Mendocino County. In literature it is listed as feeding also in *Cupressus, Pseudotsuga, Thuja,* and *Pinus.*

Carpenter Bees

Xylocopa orpifex Smith is a metallic black bee about 18 mm. long. The hairs on the head and thorax of the male are buff; those of the female, black. The bees bore large holes in sound lumber, where they store the pollen on which the bee larvae feed. They are found in flight most commonly in October, November, and December. The species also breeds in the giant sequoia and in *Juniperus.*

GIANT SEQUOIA INSECTS

Bark Beetles

Phloeosinus rubicundulus Swain, a reddish, barrel-shaped beetle about 3 mm. long, is the most common insect attacking giant sequoia. It is known to breed only in this host, very commonly attacking freshly broken limbs and tops. Attacks occur chiefly in March, April, and May, with a few throughout the summer. Often limbs lying on the snow are heavily attacked. Attacks average about one per 4 square inches. The galleries are constructed between the wood and the bark along the grain of the wood. They average about 1¾ inches in length. Of 20 galleries measured, the shortest was ¾ inch and the longest 3 3/20 inches. Each female lays about 35 eggs per gallery. The largest number counted was 75; the smallest number 16. Development is rather rapid. Pupae and new adults are found as early as July in limbs attacked early in the spring, and these two stages can still be found as late as October. It is not known whether the beetles that transform to new adults in the middle of the summer emerge immediately or winter over in the limbs and emerge with the main emergence of

the following spring. The beetles are of no economic importance. There is no record of their attacking even weakened or injured standing trees.

Lasconotus vegrandis Horn, also found in the galleries of *Phloeosinus rubicundulus*, is discussed more fully under coast redwood insects.

Nemozoma fissiceps (Fall) is a common beetle in the galleries of *Phloeosinus rubicundulus*, on which it probably preys. It is a very slender, shiny beetle about 5 mm. long. Two hornlike processes are present on the front of the head. The head and posterior half of the wing covers are nearly black; the pronotum and base of the wing covers are yellowish brown. It also occurs in the galleries of other species of *Phloeosinus* in the Sierra region.

Ambrosia Beetles

Gnathotrichus sulcatus (LeConte) is a dark brown, cylindrical, elongated beetle about 3 mm. long, which breeds abundantly in the sapwood. It attacks the trunk of recently felled and wind-fallen trees throughout the summer. Beetles have been taken from fresh attacks as late as October in a tree blown over by a windstorm early in September in Sequoia National Park. A dead adult has been taken from a wound it had made in a healthy standing tree, but there are no records of this species ever becoming established in a living tree. The adult constructs extensive galleries in the sapwood and excavates small "cradles" at the side of its galleries. An egg is laid in each "cradle" and upon hatching the larvae feed on the fungus growth that develops along the walls of the cradles. The fungus is introduced into the tree by the adult beetle. It also attacks redwood and several other genera of conifers listed under that tree.

Flatheaded and Other Borers

Trachykele opulenta Fall is a beautiful golden-green beetle about 12 mm. long, which attacks both young suppressed trees and the wounds of large fire-scorched trees. In its early stages the larvae work in the bark, and between the wood and the bark, but they later mine the sapwood and heartwood. According to one field record they can develop entirely in the thick bark. When fire-scorched trees are attacked the mines are chiefly in the dead sapwood and in the outer wood along the edges of the "cat-face" where the bark is healing over. Mines also occur and emergence takes place in the dead wood of the "cat-face." Records indicate that it

takes at least three years for the beetle to complete its life cycle. Pupation occurs in August, September, and October, and transformation to the new adult stage takes place within a few weeks. The new adults overwinter in their pupal cells and emerge the following spring. *Libocedrus* is also attacked, and in the literature *Thuja* is given as another host.

Anthaxia aeneogaster Castlenau & Gory is a flattened, dark blue beetle about 6 mm. long which has been reared from small, recently broken limbs infested with *Callidium sequoiarum*. Emergence in the laboratory occurred during the spring, summer, and late winter from limbs broken the previous winter. The mines are constructed between the wood and the bark and in the sapwood, where pupation occurs.

Dromaeolus sp. Larvae which apparently belong to this genus have been collected from the thick bark of large standing green trees in Sequoia National Park. This species is further discussed under the heading Coast Redwood Insects.

Roundheaded Borers

Callidium sequoiarum Fisher is a blackish-blue beetle about 8 mm. long which bores between the wood and the bark and in the sapwood of freshly broken limbs. It has been reared during the spring from branches less than 1 inch in diameter, collected the previous winter. It probably has a 1-year life cycle. It constructs extensive galleries, reducing the sapwood to a powder that falls out through breaks in the bark, thus leaving a shell of bark around a core of inner sapwood. Giant sequoia is the only host known to be attacked by this insect.

Phymatodes nitidus LeConte is discussed under coast redwood insects. Larvae were taken at Palo Alto from the trunk of a small tree that had been dead about a year, and a single adult was reared in June from cones collected the previous November in Sequoia National Park.

Semanotus ligneus amplus Casey is a black beetle about 8 to 15 mm. in length, with the basal third of the wing covers reddish and with antennae about half as long as the body. The larvae commonly work between the bark and wood of recently felled or fire-scorched juniper, cedar, and cypress, but specimens taken from giant sequoia in the Mariposa Grove and now in the U. S. National Museum have been checked by Linsley.

LEAF FEEDERS

**Halisidota argentata* Packard is a yellowish moth with reddish forewings marked with silvery spots. It has a wing expanse of about 2 inches. The caterpillars of this moth have been observed to attack and develop to maturity on a tree 25 feet tall in Yosemite National Park. The caterpillars overwintered as small larvae on the twigs and began to feed early in spring. Considerable damage was done to the tree by these caterpillars as early as the middle of March. Pupation occurred in the last three weeks of June. The first moths emerged July 3 and moths continued to emerge until July 17. Damage is caused by the caterpillars chewing off the adnate needles. Many of the twigs were chewed nearly through, causing them to break and hang down. This infestation was controlled by handpicking the larvae. *H. argentata* usually feeds on *Pinus*, *Abies*, and *Pseudotsuga*.

Argyresthia sp. has been identified by H. H. Keifer, of the California State Department of Agriculture, from foliage of giant sequoia, on which it was apparently feeding.

Cutworms. Damage to trees in nurseries by caterpillars believed to belong to this group of insects is mentioned by Fry and White (1931). The caterpillars are reported to sever the stems just below ground level.

Diaspis carueli Targ. has been identified by Keifer from foliage of giant sequoia.

Aonidiella aurantii (Maskell) has been identified by Keifer from foliage of this tree.

Cryptaspidiotus shastae (Coleman). Infestations of this grayish scale insect have been observed on small trees in Sequoia and Yosemite National Parks, especially along dusty roads. In none of the infestations examined was the damage serious enough to affect the growth of the trees appreciably. Nothing is known about the biology of this insect on giant sequoia. In literature it is listed as attacking the coast redwood and *Juniperus*.

Hemiberlesia rapax (Comstock) was reported by Coleman (1903) as breeding abundantly on giant sequoia in the Stanford Arboretum. It has a wide variety of hosts.

**Carulaspis visci* (Schrank) was observed in February on the leaves of giant sequoia growing as an ornamental at Stanford University. It had a wide variety of hosts.

Termites

Zootermopsis nevadensis (Hagen) has been taken from the sapwood of suppressed sequoia trees infested and apparently recently killed by *Trachykele.*

Carpenter Bees and Ants

Xylocopa californica Cresson and *X. orpifex* Smith were found to have had a large colony in the dead top of a green tree 12 feet in diameter when it fell in Sequoia National Park several years ago. *X californica* resembles *X. orpifex,* but is larger and its body has a greenish metallic sheen. The habits of the two species are similar. They bore holes in sound dead wood, where they store pollen on which the bee larvae feed.

Camponotus sp. This ant was taken from the heartwood at the base of the tree mentioned in the preceding paragraph. A fire scar extended nearly around the base of this tree, and the ants were working in the fire-scorched wood. Observations indicated that it was the activity of this insect, coupled with rot, which undermined the support of the tree, causing it to fall. Members of this genus are also very common in old giant sequoia stumps.

The specific names of the two insects listed below indicate that they feed on either of the sequoias, but later records do not bear this out.

Vespamima sequoiae (Hy. Edwards) is listed in the original description as if it fed in *Sequoia sempervirens,* but the writer has been able to find no authenticated later record that it attacks this host. Records obtained thus far indicate that it breeds only in *Pinus* and *Pseudotsuga.* The late G. P. Engelhardt, who revised this family, wrote me that he had no record of this moth working in sequoia.

Sphinx sequoiae Boisduval was described in 1868 from "a single individual found resting on the trunk of a tree in the forests where the gigantic conifers called *Sequoia* grow," hence its name, but so far as is known, no one has ever found it attacking or feeding on *Sequoia.*

SUMMARY

Fifty-two insect species are listed from coast redwood and twenty species from giant sequoia. Nine of these species are common to both hosts, but all nine of them have additional hosts. Four species feed, so far as is known, only on *Sequoia,* three of them

being confined to redwood and the other feeding only on giant sequoia. No insect has yet been found that feeds only on both sequoias.

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COLLECTING BRACHYCISTIDINE FEMALES

(Hymenoptera: Tiphiidae)

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This spring (1952) a collecting party of the California Insect Survey, Division of Entomology & Parasitology, University of California, composed of P. D. Hurd, Jr., G. A. Marsh, P. H. Timberlake and myself, made a considerable effort to collect nocturnal mutillids and tiphiids on the California deserts. The results of this effort were gratifying for six brachycistidine females and numerous mutillid females were taken, as well as a great many males of these two groups.

The first female brachycistidine was taken at Hopkins Well, Riverside County, crawling out of the sand on a sand dune sparsely covered with vegetation. Two additional females were collected about one mile north of Plaster City, Imperial County. Both of these insects were found on fine sand in an area covered with the typical desert flora. The other three females were collected in a sand dune region a short distance east of Borego, San Diego County. Two of them were taken on the leeward side of a road,

possibly blown there by the strong wind, which was prevailing at the time of our collecting.

The only generalities that can be made are that all the female brachycistidines were found on fine, unconsolidated sand at night. Whether or not these insects are partial to sandy country is uncertain, however, for we looked primarily only where there was fine sand, the small insects being more readily seen there than on coarser sand and gravel, where they could more easily hide in the shadows. On the other hand, evidence supporting their preference for a sandy situation is given by Mickel and Krombein (1942:652), who cite the capture of a female in the sand dune area of San Francisco, California, and by Hurd and Rozen, who, subsequent to the spring trip, collected two specimens in the sand dunes of Antioch, California.

The method of collecting both the tiphiid and mutillid female was a simple one. Each member of the party, using a Coleman lantern, walked about the sandy region and picked up the females by hand. The smaller females, especially those of the genus *Chyphotes*, were readily captured by moistening a finger and lightly applying it to the dorsal surface of the insect. None of the brachycistidine females were taken coming to light, if for no other reason than because we were continuously moving about. However, it is certain that at least some of them are attracted to light, for in addition to the information provided by Mickel and Krombein *(ibid.)* H. E. Evans and P. D. Hurd on their Mexican trip of 1951 secured several specimens which came to a stationary Coleman lantern. Furthermore, one of the Antioch specimens was found at the base of a Coleman lantern which had been resting on the sand for a considerable length of time.

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Range extension of Pholisora libya Scudder (Lepid., Hesperiidae): On August 13, 1951, a single slightly-worn female was taken about 13 miles northwest of Coalinga, Calif., on Highway 33, as it flew along a dry wash by the roadside. This is, as far as I can ascertain, the first record for this typically mohavian species from the west side of the San Joaquin Valley.—J. W. Tilden.

NEW WESTERN EPHEMEROPTERA, III

VELMA KNOX MAYO

Nickel Plate, British Columbia

(Plate III, figures 9, 11)

Ameletus monta Mayo, new species

Male imago in alcohol. Head brown; ocelli white, bordered by dark brown at bases. Pronotum dark brown with fine tracheations laterally. No creamy areas on postero-lateral edges of pronotum as in *A. celeroides* McDunnough. Mesonotum dark brown with creamy white in unsclerotized area between prescutum, and scutum; also creamy spot on either side of midline near scutellum. Pleural sclerites dark brown; unsclerotized areas at bases of wings creamy white. Sternites brown. Forelegs pale yellowish-brown; middle and hind legs creamy. Wings with a reddish-brown tinge due to prominence of reddish-brown longitudinal veins, cross veins less distinct; stigmatic area milky. Abdomen semi-hyaline; first tergite dark brown, tergites 2-7 semi-hyaline, washed with pale tracheations; laterally tergites 2-7 very pale; 8-10 dark brown with pale streak on edges. Sternites paler than tergites; 2-8 with blackish ganglionic markings; anterior border and lateral edges of sternite 9 brown. Genitalia as in figure 11. Forceps and forceps base very pale yellowish brown. Penes are narrow, parallel, and slightly incurved at tips; at the base of each are three prominent spines. Tails white, with minute brown hairs. Each segment delicately bordered posteriorly with reddish brown.

Male, pinned. Thorax dark brown. Forelegs dark brown; middle and hind legs yellowish. Wings brown tinged; longitudinal veins prominent; cross veins less so, but not indistinct. Abdomen much as in alcoholic specimen, but the posterior borders show as darker bands of brown; segments 8-10 dark brown; tergites with dark tracheations; sternites paler than tergites with ganglionic areas blackish. Genitalia and tails brown. Length body, 10 mm; wing 10 mm.

Female in alcohol. More uniformly colored than male. Thorax light reddish-brown with same creamy areas at wing bases. Forelegs yellowish-brown, middle and hind legs pale yellow tinged with red on tarsi. Wings tinged with brown. Abdomen not semi-hyaline as in male. Tergites about same shade as thoracic notum, posterior borders darker, all tergites with fine tracheations. Sternites paler than tergites but not hyaline as in male. Ganglionic areas blackish. Subanal plate very small, covering less than half the eighth segment. Tails white, speckled with short brown hairs as in male.

Nymph. Head and thorax brown; median line of thoracic notum pale. Legs yellowish-brown with last tarsal segment dark reddish-brown. Abdominal tergites brown with dark submedian streaks from anterior margins; area between these streaks pale on segments 3 and 4; laterally dark streak extending from posterior margin near medial side of gill attachment nearly to antero-lateral corner of tergite. Tracheae of gills are numerous and readily seen under microscope, but cannot be seen with naked eye. Sclerotized band present on gills as far from margin as width of band (fig. 9). Ventrally, ganglionic markings distinct on sternites 2-8; sternite 1 pale; 2-4 and 8

uniformly brown; 5-7 pale except around ganglionic markings; 9 pale; each sternite with brown patches on either side of midline; small distinct white patches in antero-lateral corners. Tails fringed; pale basally, banded with dark brown medially and pale distally.

Holotype, male imago (in alcohol) McGuigan Creek, Paine Mountain near New Denver, British Columbia, altitude 6,500 ft., August 29, 1940. *Allotype,* female imago same data. *Paratypes,* one vial, same data. One male imago, paratype, and one nymph in collection of California Academy of Sciences. Rest of material in collection of writer.

Ameletus monta new species is related to A. *celeroides* McDunnough. The distinguishing character is mainly in the genitalia. A. *monta* has three large spines on each penis whereas in A. *celeroides* there are but two small spines on each penis. A. *monta* is larger in body form.

Ephemerella flavilinea McDunnough

Dr. McDunnough loaned me specimens of *Ephemerella flavilinea* McDunnough and I was thereby able to determine that the species occured very commonly in the Jackson, California region in May, 1938. The nymphs were reared and both male and female imagos obtained. The imagos varied in color, some darker, others paler. It was found that the specimens taken from Jackson Creek were slightly smaller than those from Dry Creek in the same region.

Ephemerella delantala Mayo, new species

(Plate I, figure 2)

Nymph. (fig. 2). A member of the *E. simplex* group. Yellowish species with brown markings. Head yellowish on vertex; mouthparts brown. Maxillary palp present. Pronotum yellow, with faint traces of adult pattern showing through, more distinctly in male. Mesonotum yellow, with dark brown pattern as in fig. 2, giving a banded appearance across anterior third of mesonotum. Pleural and sternal sclerites brown. Forelegs yellowish; middle and hind coxae dark brown; trochanter and basal half of femora brown; tibiae and tarsi yellowish, amber colored near claws. Six or seven minute denticles on claws. Abdominal tergites 1-3 dark brown in both sexes; in the male the 4th tergite is brown laterally and yellow medially; in female, 4th tergite is more uniformly brown (fig. 2). In both sexes tergites 5-7 are wholly yellow, tergite 8 dark brown along posterior border and lateral angles, yellow anteriorly, tergite 9 wholly brown, tergite 10 yellow. The dorsal abdominal spines give the appearance of folds on either side of midline forming a pleat on tergites 4-8. The spines on tergites 4-8 are conspicuous and increase in size to rearward; they bear fine spicules. On tergites 2, 3, and 9 projections relative to spines on posterior margins are scarcely visible. Prominent postero-lateral spines present on segments 5-8 (fig. 2); these are curved up dorsally forming a trough between the lateral and dorsal spines in which lie the gills. Gills

present on segments 4-7 only; those on 4 semi-operculate. Ventrally, abdominal sternites 1-4 brown; 5-7 and anterior part of 8, yellow tinged with brown on either side of midline; lateral angles and posterior portion of 8 and anterior half of 9 dark brown. Tails yellowish with light fringe of hairs on distal half. Length: body of male nymph 5 mm; female nymph 6 mm.

Holotype, nymph (in alcohol) Martis Creek near Truckee, Placer County, California, altitude 6,000 ft., June 23, 1933. Collected by Dr. P. R. Needham and party. *Paratype*, one nymph, same data. Holotype in collection of the California Academy of Sciences. Paratype in collection of writer.

Ephemerella delantala new species is related to *E. margarita* Needham. It is a member of the *E. simplex* group and readily distinguishable from *E. attenuata* McDunnough and *E. simplex* McDunnough. The former has tubercles present on the head and thorax; in *delantala* there are no tubercles on head and thorax. *E. simplex* has no dorsal abdominal spines and no denticles on claws, both of which are present on *delantala*. *E. margarita*, to which *E. delantala* is most closely related, is larger; the legs are pale, tibiae and tarsi banded; in *E. delantala* the trochanter and basal half of the femora are dark brown; tibiae and tarsi not banded. Lateral extensions of abdominal segments 5-8 are well developed on *E. delantala*, present on segments 4 to 9 in *E. margarita*. "Rather short dorsal spines present on tergites 3-9" in *E. margarita*, prominent dorsal spines present on segments 4-8 of *E. delantala*. Abdomen broadest at segment 7 in *E. margarita*; broadest at segment 5 in *E. delantala*. Tails not banded in *E. delantala* as in *E. margarita*.

Baetis palisadi Mayo, new species

(Plate II, figures 3, 5. Plate III, figure 6)

Male imago (fig. 5). Head brown. Turbinate eyes fairly large; orange. Pronotum with dark brown lateral triangles; median area smoky; posterior margin widely banded with creamy. Mesonotum rich dark brown with creamy areas on either side of parapsidal grooves extending to tip of scutellum; laterally, brown. Metanotum and first abdominal tergite dark brown. Pleural sclerites deep brown, unsclerotized areas creamy. Wings hyaline; venation colorless, stigmatic area milky; cross veins in stigmatic area very indistinct, some appear to be anastomosed. Hind wing with well developed costal projection, three veins and no intercaleries; the third vein is well developed, extending to beyond the middle of hind margin (fig. 3). Legs pale, colorless; coxae pale with brown sutures; femora pale with faint tinge of brown near tibial joining, likewise tibia with pale brown tinge at tarsal joining; claws dissimilar, brown. Abdominal tergites 2-6 hyaline, tergite 2 with two pale smoky spots on anterior margin, but these are lacking on

remainder of tergites; tergites 7-10 yellowish-brown. Tails colorless. Laterally the tergites are faintly tinged with smoky around stigmatic area. Sternites 2-6 hyaline, sternite 1 yellowish, sternites 7-9 deeper yellow. Forceps pale yellowish; genitalia as in fig. 6. Length of body 8 mm; wing, 8 mm.

Female imago. In the female the coloring is more uniformly light brown. The brown thorax is much lighter than that of male. Wings hyaline, venation distinct, light brown. Legs yellowish with sutures outlined in brown; all femora with brown streak the entire length of anterior and posterior surfaces; tarsal joinings brown, claws brown. Abdomen not hyaline, but a yellowish brown; each tergite is marked near the anterior margin with two pair of small dark patches, one above the other on either side of midline; laterally near pleural fold each tergite has two brown markings. Sternites are pale yellow, marked as tergites with two brown streaks on either side of mid-ventral line near the anterior margin; sternite 9 shaded with brown. Tails pale. Length: body 8 mm; wing 8 mm.

Holotype, male imago (in alcohol), Big Pine Creek, Sierra Nevada Mountains, Inyo County, California, altitude 8,100 ft., July 5, 1939. Collected by the writer. *Allotype*, female imago, same data as male. *Paratypes*, three male imagos; one female imago, same data. Holotype in the collection of the California Academy of Sciences. Paratype, one female in same collection. Others in collection of the writer.

In type of genitalia *Baetis palisadi* new species is allied to *B. piscatoris* Traver and *B. adonis* Traver, from California, and *B. lasallei* Banks of Wisconsin. *B. palisadi* is considerably larger than any of these. It can readily be distinguished from *B. piscatoris* by the abdominal tergites which are not banded; from *B. lasallei* it can be separated by the absence of intercalaries in the hind wing; also by the absence of black dots on each tergite, in the male. The maculation of the entire body differs from that of *B. adonis*. In the hind wing the third vein is well developed in *B. palisadi*, in *adonis* it is short, ending in the basal third of hind margin.

Ephemerella sierra Mayo, new species

(Plate I, figure 1, and Plate III, figures 7, 8)

Nymph (Plate I, fig. 1). Color of mature nymph dark brown with a distinct reddish tinge on abdomen and ventral surface. Immature nymphs light brown. Head with a pair of prominent, erect occipital tubercles; vertex light brown between tubercles. On the pronotum is a twin pair of long, pointed tubercles which are subequal, the posterior in some cases being slightly shorter; medially, next to posterior tubercles is a pair of shorter tubercles, plainly visible; on same level as anterior twin tubercle is a smaller sharp, lateral tubercle; between the twin tubercles the pronotum is light brown; laterally, dark brown. The tubercles are covered with small, heavy spines. There are three pairs of tubercles on the mesonotum; the first is near

Plate I: Fig. 1 *Ephemerella sierra,* n. sp., nymph. Fig. 2. *Ephemerella delantala,* n. sp., nymph.

the anterior margin, one tubercle on either side of midline; a ridge extends from each short, blunt tubercle to the antero-lateral angle of mesonotum. Laterally and slightly posterior to the anterior tubercles is the second pair of longer ones in the middle portion of segment is a third pair, very much larger, wide basally and directed backwards. The area between the large tubercles and the scutellum is light brown; the rest of scutum is dark reddish brown; all tubercles and the area between them along midline are covered with short, heavy, black spines. On the posterior portion of mesonotum are numerous long hairs. There is a slight hump between wing pads which corresponds to the scutellum of the adult. Legs light, washed with darker brown; traces of a dark streak on each femur, fore femur with no teeth on anterior margin. Tibial thumb fairly sharp. Hind tibia as long as trochanter and femur combined. Prosternum with a long, blunt tubercle directed towards head. Mesosternum light reddish brown except for two distinct lunate, dark markings, one on either side of midline behind leg bases. Pleural sclerites dark brown; unsclerotized areas light. Abdominal tergites 2-9 each bears a pair of sharp tubercles on posterior margin; those on tergites 2-7 are approximately the same size and directed backwards, those on segments 5-6 are wider apart than the others. The tubercles on tergites 8-9 are very much longer, at least four times the length of those on segments 2-7 and bear numerous long, heavy bristles; the tubercles on tergite 8 are more erect than those on 9, which are directed backwards. Tergites 3-7 and 10 are deep reddish brown, very dark laterally, tergites 2 and 8-9 are light brown between tubercles and darker laterally. Gills on segments 3-7. Abdominal sternites reddish brown; laterally on each segment are two dark red markings on either side of midline; the medial of these is an oblique streak from anterior margin. There is a trace of a dark mid-ventral line on sternites 5-9; sternites 1-5 are lighter along midline. Lateral prolongations of abdominal segments as in fig. 8, pl. III. Tails dark brown in basal third, the outer two-thirds alternately light and dark, each segment ringed posteriorly with spines. Length: body 11-12 mm.

Holotype nymph, SOUTH FORK BISHOP CREEK, INYO COUNTY, CALIFORNIA, altitude 9,500 ft., August 28, 1938. *Paratype:* eight mature nymphs, same data. Two immature nymphs. American River, California, altitude 4,200 ft., July 24, 1938. Collected by the writer. Twenty immature nymphs collected by Dr. P. R. Needham and party as follows: Independence Creek, one mile above Independence, California, June 13, 1934. South Fork Bishop Creek, June 20, 1934, June 25, 1934. Megee Creek, Mono County, July 6, 1934. One paratype in collection of California Academy of Sciences.

One nymph collected July 4, 1938 South Fork Bishop Creek, Inyo County, California, altitude 9,500 ft., was removed to Mammoth Lakes, Mono County, California, altitude 8,000 ft., and reared to the subimago stage. The subimago emerged on August 28, 1938.

Following is a description of the specimen: Bright red species. Head reddish brown, yellow around bases of antennae. Ocelli white. Pronotum deep

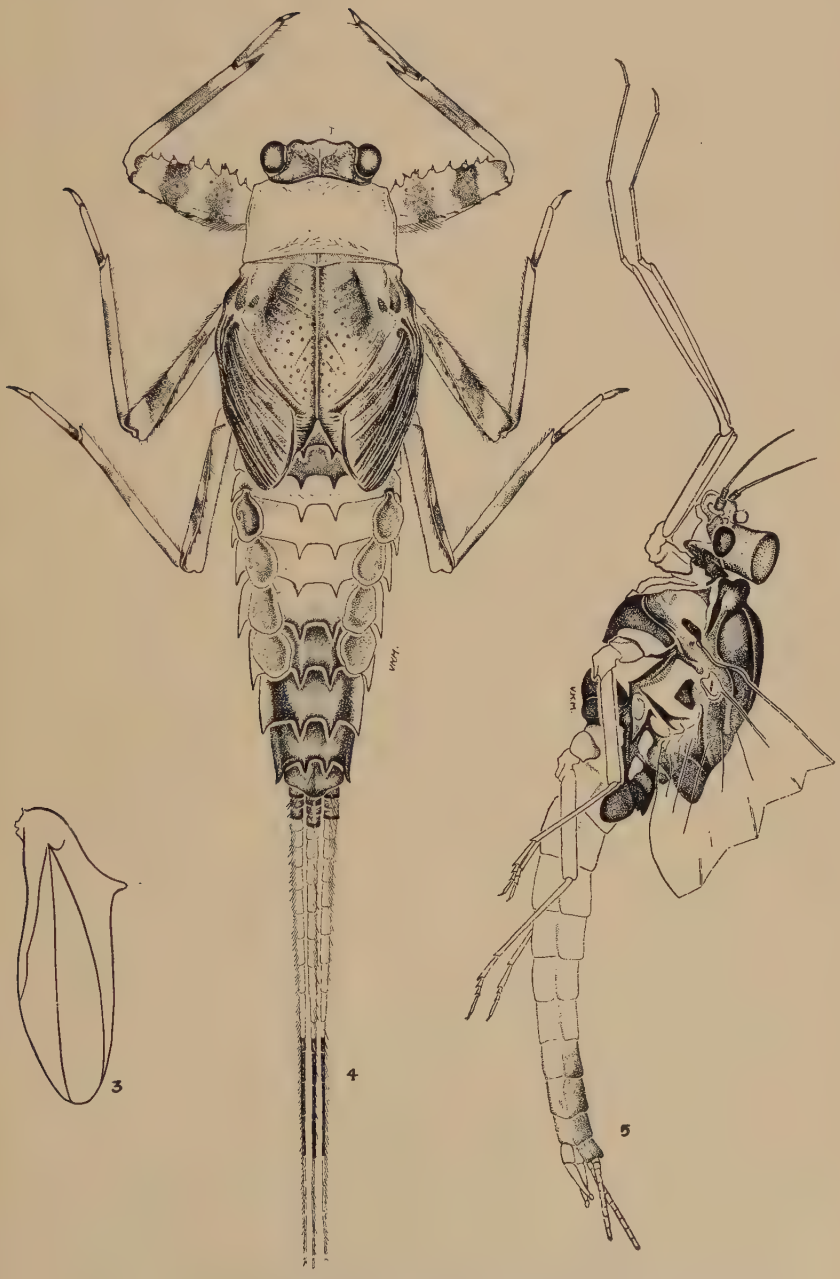

Plate II: Fig. 3. Hind wing *Baetis palisadi*, n. sp. Fig. 4. *Ephemerella wilsoni*, n. sp., nymph. Fig. 5. *Baetis polisadi*, n. sp., adult.

reddish brown laterally with a light red area in the medial portion. Mesoscutum lighter brown surrounded by bright red. Light area on either side of midline near scutellum. Pleural sclerites bright red tinged with rose; unsclerotized areas light and powdery white in part. Wing venation dark brown; adult subcostal vein shows through as bright red. Fore legs deep reddish brown, femora of middle and hind legs light yellow in basal half and bright red distally; tibiae yellowish and tarsi tinged with dark brown. All abdominal segments bright red; each tergite bordered posteriorly by yellowish white, the latero-posterior angles and pleural fold whitish. Ventrally all segments but the ninth are bordered posteriorly with yellowish white; each sternite with a dark lunate streak from anterior margin on either side of mid ventral line. Forceps base light reddish brown; forceps and penes dark reddish brown (see genitalia, fig. 7, pl. III). Tails blackish in basal half; brown apically. Length: body 11 mm; wing 14 mm; tails 10 mm.

Ephemerella sierra new species is a member of the *E. fuscata* group and allied to *E. autumnalis* McDunnough of British Columbia. Dr. McDunnough kindly loaned me specimens of *E. autumnalis* and I was able to determine that the nymphs which I reared from Wilson Creek near New Denver, British Columbia on August 10, 11, 12, 1940 at an altitude of 1,700 ft., were undoubtedly *E. autumnalis*. On the nymphs of *E. sierra* and *E. autumnalis* the tubercles are similar; the twin tubercles on the pronotum are subequal; this is the main difference between these species and *E. spinifera* Needham. The tubercles on abdominal segment 8 in *E. sierra* are erect and those on segment 8 of *E. autumnalis* are "bent backward and downward." The body of *E. sierra* is stouter than that of *E. autumnalis*.

I also reared an *Ephemerella* species closely related to *E. sierra*, from Shephard Creek, Brexton, British Columbia, altitude 3,500 ft., on July 1, 1940. I failed to rear the male imago, but obtained two female imagos. Judging from the marked difference in general appearance of the nymphs and also from the variation in dates of emergence, this Brexton species is certainly not *E. autumnalis* and further study on more material will be necessary to determine its relationship to *E. sierra*.

Ephemerella wilsoni Mayo, new species

(Plate II, figure 4 and Plate III, figure 10)

Male imago, pinned specimen (fig. 10). Blackish-brown. Head black, Thoracic notum blackish; unsclerotized areas on pleuron pale reddish-brown. Fore legs dark brown; middle and hind legs paler, with tibiae and tarsi yellowish. Wings hyaline; longitudinal veins dark brown; cross veins indistinct; finger-like prolongations of wing membrane extending well beyond tip of scutellum. Abdomen reddish-brown, pleural fold and posterior borders of

segments pale. Forceps light brown, penes blackish. Tails black basally, pale brown distally.

Female imago unknown.

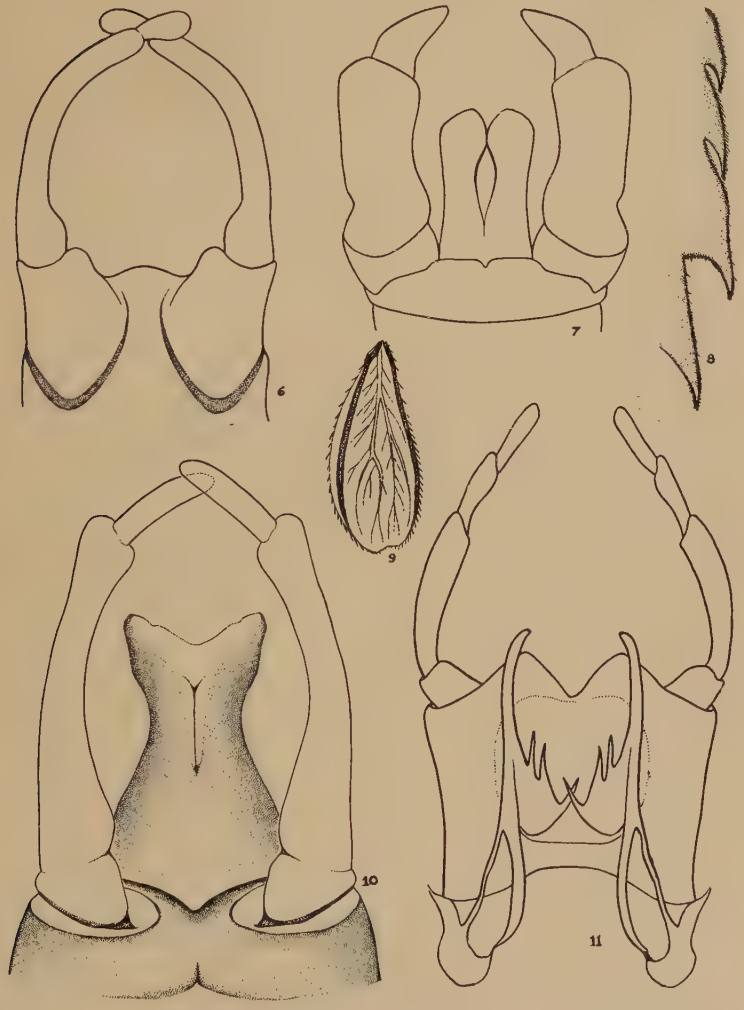

Plate III: Fig. 6. Male genitalia *Baetis palisadi*, n. sp. Fig 7. Male genitalia subimago, *Ephemerella sierra*, n. sp. Fig. 8. Lateral prolongations of abdominal segments of nymph, *Ephemerella sierra*, n. sp. Fig. 9. Gill of nymph of *Ameletus monta*, n. sp. Fig. 10. Male genitalia of *Ephemerella wilsoni*, n. sp. Fig. 11. Male genitalia of *Ameletus monta*, n. sp.

Male imago in alcohol. Thorax blackish-brown; abdomen a light reddish-brown. Pronotum smoky with black tracheations; blackish on either side of midline; postero-lateral corners white. Mesonotum blackish-brown; distinct white strip between prescutum and scutum; prescutum black; white patch near prescutum on either side of scutum proper. Medially the entire scutum darker than the sides which have a reddish tinge; yellow patch laterally on postscutum light red patches medially and laterally on scutellum. That part of wing membrane attached to the scutellum is developed into a finger-like process extending well beyond the tip of scutellum. Pleuron of prothorax is white with delicate tracheations. On mesopleuron the sclerites are blackish-brown, and unsclerotized areas white with faint tracheations. The entire prosternum is white, unsclerotized with the exception of the basisternal sclerite, a small blackish brown area between fore coxae. Mesosternum blackish with white along midline. Fore legs dark brown; coxae and trochanters brown with black tracheations; femora, tibiae and tarsi blackish. Middle and hind legs pale yellowish with delicate black tracheations on coxae and trochanters; femora with margins pale yellow, centers smoky with dark tracheations, brownish tinge in outer third; tibiae pale with very delicate tracheations in basal portion, tarsi and claws tinged with brown on dorsal surface. Wings hyaline; longitudinal veins blackish; cross veins pale, indistinct; stigmatic area milky. Abdomen much lighter than thorax. Tergites with reddish brown markings on a yellow background, and dense network of tracheations; along the mid-dorsal line is a hyaline streak bordered on either side by reddish streaks which attain the anterior margins; these are prominent on segments 2-4. Tergites 1-2 smoky with dense tracheations; at anterior border on tergite 2 are wide, narrow hyaline patches on either side of mid-dorsal streak; on tergite 3 they are larger and on 4-7 they extend from the mid dorsal line to the lateral edge of tergite so that the reddish markings on these segments do not attain the anterior border, except at midline. The posterior borders of tergites 1-2 are dark smoky with dense tracheations; those of tergite 3 less so with irregular blackish spots; 4-8 yellowish and 9 reddish brown. Laterally each tergite is yellow; the stigmatic areas are marked with light patches surrounded by deep reddish-brown; these dark brown lateral patches are prominent on all tergites. Reddish brown coloring of segments 8-10 darker than that of other segments. The posterior borders of sternites 1-8 are distinctly yellow as is also the midline. Laterally each sternite with a prominent dark reddish brown area; these are marked with two oblique pale streaks extending from the anterior margin of each sternite and also in the central portion of each segment (except 9) near midline, are two small pale dots outlined with reddish brown. The antero-lateral angles of each sternite pale brown; ganglionic patches dark smoky on sternites 1 and 2, 4 and 5. Sternites with fewer tracheations than tergites. Tails black basally, reddish medially with distal half white. Genitalia (see fig. 10) reddish-brown. Forceps not swollen apically. Last segments of forceps white; first and second segments reddish brown. Length body 14 mm; wing 15 mm.

Nymph, male (fig. 4.) Alcoholic specimen dark brown with white pronotum. Living specimen black distinguished by prominent white pronotum. Head black, mottled with brown. Roughened area on vertex indicating very

slight occipital tubercles. No frontal horns or frontal shelf. Pronotum entirely white with faint tracheations. Mesonotum blackish with creamy patches on either side of midline near scutellum. Anterior border of scutum also creamy; heavy tracheations on scutum. Thoracic sternites pale with prominent dark ganglionic areas. Legs pale, banded with black. Coxae with well developed spinous ridge along anterior suture. Fore femora with heavy spines along anterior margin. Tibial thumb long, sharp. Abdominal tergites 1-9 with paired short spines. Tergites 3-6 white except under gills; spines on these segments also white; other tergites blackish with pale lateral margins; tergites 9 and 10 wholly dark, tergite 10 with long hairs from medial part anterior margin. Gills present on segments 3-7. Abdominal sternites light brown except 8 and 9 which are black; ganglionic markings on 1-7. Tails white except close to base where each is ringed with black, and beyond middle where a fifth of length is black. Length body 9 mm; tails 7 mm.

Holotype, male imago, pinned; Wilson Creek, near New Denver, British Columbia, September 3, 1940, altitude 1,700 ft. *Paratypes,* two male imagos pinned, September 4 and 7, 1940, same locality. One male imago in alcohol, August 28, 1940, same data. One paratype, male imago pinned, and one nymph and cast skin in collection of California Academy of Sciences.

Ephemerella wilsoni new species is similar to *E. coloradensis* Dodds. Dr. McDunnough loaned specimens of *E. coloradensis,* both nymphs and adults, and the two species are readily distinguishable. The adults of *E. wilsoni* are much blacker than those of *E. coloradensis.* There is no distinct color contrast in nymph of *E. coloradensis* as in *E. wilsoni.* Occipital tubercles more prominent in *E. coloradensis,* and the tibial thumb is blunter than in *E. wilsoni* (see fig. 4). Also the abdominal spines are smaller than those of *E. wilsoni* and covered with spicules which are not present on the spines of *E. wilsoni.*

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NOTES ON THE ECOLOGY OF CULISETA MACCRACKENAE IN SAN BERNARDINO AND RIVERSIDE COUNTIES, CALIFORNIA

(Diptera: Culicidae)

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For the past year, data have been obtained on the breeding habits of *Culiseta maccrackenae* Dyar and Knab. There is some question as to previous collections having been made from San Bernardino County. Several specimens collected by the authors have been deposited with the Bureau of Vector Control, Berkeley.

Collection records from Urbita Springs, near San Bernardino, California:

Fourth instars, pupae and adults, March 8, 1951.

Four instars, March 15, 1951.

Adults (numerous), May 13, 1951. Collected in clumps of tall dead grass in willow brush.

Habitat: *Culiseta maccrackenae* were quite abundant at Urbita Springs during March, 1951. After careful inspection of breeding conditions, the area was dusted by mosquito control personnel. Larvae and pupae on March 8, 1951 were numerous in a borrow pit 10 ft. in diameter and located in a grove of deciduous trees not in leaf. The water was 11 - 44 cm. deep, partially shaded, and contained considerable decaying debris in the form of tree leaves, twigs, and grass. Most of the surface was covered by *Lemna*, duckweed. The pH was 7.2 and the temperature ranged from 12° C. at 9:00 a.m. to 15° C. at 2:20 p.m. on February 22, 1951.

Adult mosquitoes were resting on the 2 - 3 ft. high moss-covered banks of this pool and under overhanging grass. Many were also collected in tall dead grass, weeds and brush in the immediate vicinity of the breeding area. *Culiseta maccrackenae* females were also taken from inside the lodges of *Neotoma fuscipes* on February 22, and November 29, 1951 in San Timoteo Canyon, Riverside County.

At Urbita Springs, several females attempted to bite at which time they were collected alive in shell vials and returned to the laboratory. In the laboratory at 3:45 p.m. on March 8 one female completely engorged with blood on the author's arm. On March

21, seven adult females from the March 8 collection were given the opportunity to feed on a human subject, one fed to complete engorgement and two took partial blood meals. The latter two had consumed considerable sugar water before the opportunity to feed on blood was presented to them. April 1, at midnight, one female fed readily on a human host and obtained almost a complete blood meal. Bites of this species were painful for one-half hour following the bite and large welts appeared at each feeding point. Welts were visible as long as two days following the initial feedings. The above data indicate that this species will feed on a human host, but certainly man is not one of its preferred hosts.

Culiseta maccrackenae were observed copulating readily in the daytime under laboratory conditions. A male 12 hours of age copulated with a female 2½ days old, in a plastic cylinder 20″ x 6.5″. No blood meal had been obtained by the female. This pair remained in copulation from 9:45 a.m. until 2:45 p.m. Other pairs remained in copulation for at least two hours.

Males and females approach face to face prior to copulation. After copula is effected, they face in opposite direction. The male has frequently been seen in a vertical position suspended head down, supported only by the genitalia in copula.

In San Bernardino and Riverside counties, *Culiseta maccrackenae* breeds in very limited numbers, except for certain isolated pools which may in the winter and spring seasons contain moderate numbers of larvae and pupae. This is in agreement with reports on their breeding in central and northern California.

ADDITIONAL COLLECTIONS OF MOSQUITOES FROM WOOD RATS' NESTS

(Diptera: Culicidae)

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Anopheles freeborni Aitken has been reported from the nests of *Neotoma fuscipes* Baird (Ryckman and Arakawa 1951).

Four additional species of mosquitoes have been collected from wood rats' nests in California and Mexico. The authors have found mosquitoes in the nests of *Neotoma* from Mt. Diablo, April 2, 1949 to Baja California, Mexico, August 7, 1951.

Species collected from nests of *Neotoma fuscipes* Baird:

Anopheles freeborni Aitken, San Timoteo Canyon, Riverside Co., Calif. Nov. 29, 1951, 4 ♀. Dec. 12, 1951, 1 ♀.

Culiseta inornata (Williston) San Timoteo Canyon, Riverside Co., Dec. 12, 1951, 4 ♀.

Culiseta maccrackenae Dyar and Knab, San Timoteo Canyon, Riverside Co., Calif. Feb. 22 and Nov. 29, 1951, one ♀ each collection.

Culex stigmatosoma Dyar, five miles south Tijuana, Baja California, Mexico. August 7, 1951, 1 ♀.

Culex tarsalis Coquillett San Timoteo Canyon, Riverside, Co., Calif., Nov. 29, 1951, 4 ♀. Dec. 12, 1951, 11 ♀.

The above data are concerned only with the actual specimens returned to the laboratory and do not take into consideration those which frequently escaped.

In the San Timoteo Canyon a careful search has been conducted to find other resting places, but wood rats' nests were the only habitat in which the mosquitoes were found. Those taken during the winter on cold days were apparently taking refuge from the cold inclement weather; however, the collection in Mexico was on a very hot day during the dry season. In the latter situation, *Culex stigmatosoma* was apparently seeking shelter from a dry, hot environment.

The food and dung chamber in which most of the mosquitoes are found affords protection from adverse climatic conditions. It is the opinion of the authors that this recently investigated mosquito habitat is a preferred ecological niche for mosquitoes in certain environmental situations as the San Timoteo Canyon studies have indicated. When surveys of overwintering adult mosquitoes are conducted, the nests of *Neotoma* should be inspected.

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A NEW AGONUM FROM OREGON

(Coleoptera: Carabidae)

Borys Malkin and Melville H. Hatch

University of Washington, Seattle

Agonum (Anchomenus) sargentorum Malkin & Hatch, new species

Rufous impunctuate the elytra except at the extreme margins bright shining viridescent and finely transversely microstrigose.

Head: rufous, moderately elongate, eyes very strongly projecting at sides. *Antennae:* rufous, about half as long as body, second segment barely twice as long as wide, third segment the longest slightly longer than fourth which is longer than fifth (the proportions of segments 3, 4, 5, being respectively 11 :10:9) ; apical segment conical. *Thorax:* dark rufous, clouded on disc, diaphanously paler at sides, slightly wider than long (proportions of length to width 4.3:5.2), apex about seven-eighths as wide at base, sides broadly reflexed, arcuate in front, feebly sinuate before the obtuse hind angles, basal fovae deep, impunctate. *Elytra:* metallic, viridescent except for yellow side margins; sides parallel, gradually narrowing in posterior third, at extreme apex truncate and produced into a spine at the sutural angles. Elytral intervals smooth, impunctate, flat, striae finely incised, third interval with three punctures; elytral length is to the width in proportion of 15.2:8.5. *Ventral surface:* yellow-rufous, smooth, and imunctate. Legs dark yellow with apices of tibiae and femora darker. Male with a single seta on each side of last abdominal sternite. *Length* 11.9 mm.

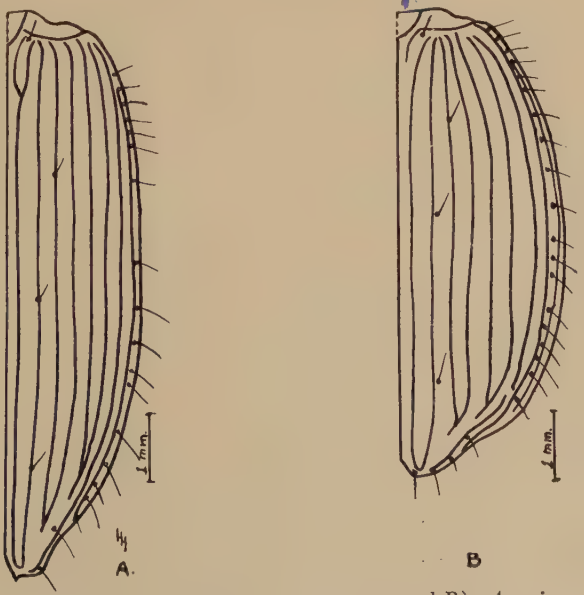

Fig. 1. Elytron of A) *Agonum sargentorum*, and B) *A. ovipenne*.

Holotype: unique male, EUGENE, OREGON. 23.VI.1941 B. Malkin collector under pile of dried cow manure, in Hatch's collection at the University of Washington.

This species runs to *Anchomenus* in Casey's[1] key in which group it traces to *ovipenne* Mannerheim. From this species as well as from the other species of the group it may be readily distinguished by the metallic, viridescent coloration of the elytra and rufous coloration of the body. The elytra are likewise narrower than in *ovipenne* and parallel at the sides; the intervals are more flat instead of being convex as in the Mannerheim species; and the tip of the elytra is produced, a character absent in *ovipenne.* It is possible that the rufous coloration is due to immaturity.

We have named this striking species after Mr. and Mrs. Samuel Sargent of Portland, Oregon, whose enthusiasm for beetle collecting has contributed numerous specimens to our respective collections. The drawings of the elytra (fig. 1) were executed by Helen Gellermann Houk.

[1]Casey, T.L., "A Revisional Study of the American Platyninae" Memoirs. IX. 1920.

NOTES ON TWO SPECIES OF CALIFORNIA STEM BORERS

(Hymenoptera, Cephidae)

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University of California, Berkeley

In his monograph on the Cephidae Ries (1937)[1] was able to examine only five specimens of *Caenocephus aldrichi* Bradley. Recently two additional specimens have come to the author's attention. One specimen extends the range into California and the other verifies its occurrence in Washington. The only previous Washington record (holotype) is based on a poorly labeled specimen presumably from Washington Territory deduced from the abbreviation "W. T." The collecting data from the new specimens are as follows: California, Contra Costa County: *Orinda,* ♀, V-24-51 (G. Loshbaugh, Middlekauff collection, on *Conium maculatum* Linnaeus. Inasmuch as the host is unknown the notation that this

specimen was taken on poison hemlock may be significant. Washington, King County: *Seattle*, ♀, V-22-45 (H. J. Jensen, C. I. S.[2]).

Several specimens of the very rare *Janus rufiventris* (Cresson) have also been collected in Berkeley. Data are as follows: California, Alameda County: *Berkeley*, ♀, IV-23-48 (R. E. Beer, Middlekauff collection); ♀, III-27-51 (W. Middlekauff, C. I. S.). The latter specimen was collected on the foliage of coast live oak, *Quercus agrifolia* Neé, but considering that all of our other species of *Janus* bore in the pith of woody plants, this record is probably not significant.

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[1]Trans. Amer. Ent. Soc., 1937, 63:259-324. October.
[2]Collection of the California Insect Survey, Univ. of Calif., Berkeley.

Book Notice

The Aphid Genus Periphyllus. By E. O. Essig and Frieda Abernathy. 166 pp., 43 figures. University of California Press, Berkeley and Los Angeles, California. Price $3.00. 1952.

This book represents a comprehensive study of the aphid genus *Periphyllus*. It consists of eleven chapters. The first is devoted to a discussion of the genus and considers its origin, history and the many forms of individuals that are encountered. A system of symbols is given to designate the various distinct forms that are recognizable, which in the species *P. californiensis* (Shinji), totals 17. A number of the species have extremely complicated life histories and seasonal cycles. Of great interest are the peculiar dimorphic stages which are characteristic of several of the species. These young dimorphs of the fundatrigeniae appear in April and May. They are tiny, nearly microscopic, disc-like individuals which remain in the first instar without any appreciable growth throughout the long hot summer. In the fall they suddenly begin to grow, complete their development in a very short time, and give rise to parthenogenetic and apterous or alate sexual individuals. The complicated developement indicates a very long association with their host.

The remaining ten chapters are devoted to a discussion of each of the known species. For each species an account is given of the published records, description, historical review, known life history, and seasonal trend, host range and other information such as that which pretains to distribution, and collection records.

Detailed life history and seasonal studies were conducted with the California maple aphid, *Periphyllus californiensis* (Shinji) and the European maple aphid, *P. testudinacea* (Fernie). It was these investigations that revealed the complexity of development and they well illustrate the need for a careful and thorough approach to similar biological problems.

The book is excellently illustrated and should be in the library of every aphidologist as well as ecologists and other entomologists who are interested in insect life histories and biology.—A. E. Michelbacher.

INTERNATIONAL CODE OF ZOOLOGICAL NOMENCLATURE; PROPOSED AMPLIFICATION, CLARIFICATIONS AND EXTENSIONS TO BE CONSIDERED BY THE INTERNATIONAL CONGRESS OF ZOOLOGY, COPENHAGEN, 1953.

Zoologists and palaeontologists are reminded that at its meeting held in Paris in 1948 the Thirteenth International Congress of Zoology decided that a number of general problems of great importance involving the text of the International Code of Zoological Nomenclature should be brought forward for decision at the next (Fourteenth) International Congress of Zoology at its meeting to be held in Copenhagen in 1953. The Paris Congress further decided that, as a preliminary to the submission of these problems to the Copenhagen Congress, the Secretary to the International Commission on Zoological Nomenclature should confer with interested specialists and, having done so, should submit comprehensive Reports, with recommendations.

In pursuance of the duties so entrusted to me, I have prepared papers on each of the problems remitted to me for Report, in each of which I have set out the issues on which, as it appears to me, the Copenhagen Congress will need to take decisions. In these papers also I have submitted for consideration a number of suggestions based upon such preliminary consultations as it has already been possible to hold. The object of these papers is to elicit expressions of opinion on the issues involved from as wide a circle as possible of interested specialists.

The subjects dealt with in the papers referred to above are the following:

(1) Emendation of zoological names: proposed substitution for Article 19 of simple clear-cut rules capable of being easily applied (Commission's reference Z.N.(S.)356);

(2) Clarification and amplification of the rules relating to the naming of families and lower categories of suprageneric rank (Commission's reference Z.N.(S.)357);

(3) Proposed introduction of rules for regulating the naming of Orders and higher taxonomic categories (Commission's reference Z.N.(S.) 360);

(4) Species to be accepted as the type species of a nominal genus, the name of which was published in a generic synonymy, if names so published are to be treated as possessing nomenclatorial availability (Z.N.(S.)387);

(5) Application to be given to a trivial name which, when first published, was applied to a particular species or specimen but which is stated also to be a substitute name for some previously published name (Commission's reference Z.N.(S)361);

(6) Neotypes: question whether this class of type specimen should be officially recognized and, if so, under what conditions (Commission's reference Z.N.(S.)358);

(7) The means to be devised for securing stability in zoological nomenclature (Commission's reference Z.N.(S.)359).

A special volume (vol. 7) of the *Bulletin of Zoological Nomenclature* has been allotted for the publication of the foregoing papers, which it must be understood constitute an important instalment of the Agenda on nomenclature questions of the Copenhagen Congress next year. Parts 1/2 containing the first instalment of the above papers will be published on 25th February 1952; the whole of the remainder of the volume will be published within the next six weeks.

The object of the present NOTICE is to draw the attention of zoologists and palaeontologists to the arrangements being made for the consideration of the foregoing problems by the Copenhagen Congress next year, and to express the hope that Nomenclature Committees of museums and other scientific institutions and also as many individual specialists as possible will furnish as soon as possible answers to the questions specifically asked in the concluding paragraph in each of the seven papers enumerated above regarding the action which, in their opinion or, in the case of Committees, in the opinion of their members, it is desirable that the Copenhagen Congress should take on each of the important problems involved. It is particularly hoped that there will be a wide and representative response to the present appeal, so that the proposals to be submitted to the Copenhagen Congress may be such as will command the widest possible measure of support among the general body of zoologists and palaeontologists, both those engaged on taxonomic work and also those engaged in the teaching of zoology and geology and those working in the various fields of applied biology.

Nomenclature Committees and individual specialists who respond to the present appeal for assistance and advice will render a double service if they will be so good as to assist the International Commission by observing the following procedure when furnishing statements of their views: (1) Where comments are furnished on two or more of the general problems enumerated above, the comments furnished on each of those problems should be on separate sheets of paper. (2) Every comment furnished should be clearly marked with the Commission's Reference Number as indicated in the list given above. (3) Comments should be typewritten, on one side of the paper only, with wide margins and should be furnished in duplicate.

In order that there may be sufficient time to prepare the Reports called for by the Paris Congress—and thus to make those Reports available well ahead of the Copenhagen Congress—it is particularly hoped that Nomenclature Committees and individual specialists responding to the present appeal be so good as to despatch their comments as promptly as possible. They should in any case reach me not later than 31st July 1952.

All communications relating to the foregoing matters should be addressed to myself, as Secretary to the International Commission on Zoological Nomenclature (28 Park Village East, Regent's Park, London, N.W.1., England).—FRANCIS HEMMING, Secretary to the International Commission on Zoological Nomenclature.

THE FALSE SPIDER MITE GENUS PSEUDOLEPTUS BRUYANT

(Acarina: Phytoptipalpidae[1])

EDWARD W. BAKER[2] AND A. EARL PRITCHARD[3]

The genus *Pseudoleptus* Bruyant (1911) was proposed for a grass-feeding mite in Uruguay. The original description was inaccurate, and certain other mites that feed on monocotyledonous plants have been erroneously assigned to the genus.

Through the kindness of Mr. C. S. Carbonell of Montevideo, Uruguay, topotypes of *Pseudoleptus arechavaletae*, the type of the genus, have been obtained. It is the purpose of this paper to redescribe this species and to recharacterize the genus.

Genus PSEUDOLEPTUS Bruyant

Pseudoleptus Bruyant, 1911, Zool. Anz., 38: 340; Oudemans, 1928. Ent. Ber., 7: 287; Vitzthum, 1942, Klass. Ordn. Tierr. 5(Abt. 4, Buch 5): 812; Sayed 1942, Bull. Soc. Fouad 1*er* Ent., 26: 81; McGregor, 1949, Mem. S. Califor. Acad. Sci., 3(2): 1; Baker, 1949, Amer. Midl. Nat., 42: 353; Radford, 1950, Union Internatl. Sci. Biol. (Sér. C), 1: 80. Type—*Pseudoleptus arechavaletae* Bruyant; monotypic.

Trichadenus, Oudemans, 1938 (not Rondani, 1870), Tijd. Ent., 81: LXXV., Misidentification.

Oudemans (1928) included in *Pseudoleptus* certain species that properly belong to the genus *Dolichotetranychus* Sayed, and Vitzthum (1942) and Radford (1950) considered *Dolichotetranychus* to be a synonym of *Pseudoleptus*. Sayed (1942) showed that the two genera are distinct; however, the palpal and tarsal characters given for *Pseudoleptus* were inaccurate.

Oudemans (1938) considered *Pseudoleptus* to be a synonym of *Trichadenus* Rondani. The writers concur with Sayed (1942), however, that *Trichadenus* cannot be recognized with certainty on the basis of the original description alone. Moreover, the type of *Trichadenus* was found on mulberry, and *Pseudoleptus* is known only from salt grass.

Pseudoleptus resembles *Pentamerismus* McGregor, *Aegyptobia* Sayed, and *Phytoptipalpus* Trägårdh in that the palpus is five segmented, a condition that is not found in other phytoptipalpid

[1]Considered by various authors as the Pseudoleptidae, Trichadenidae, or Tenuipalpidae. The genus Phytoptipalpus, however, was first used as the basis for a suprageneric name.

[2]U. S. Department of Agriculture, Bureau of Entomology and Plant Quarantine, Washington, D. C.

[3]University of California, Berkeley.

Fig. 1. *Pseudoleptus arechavaletae*, female, dorsal aspect.

genera. *Pseudoleptus* differs from *Pentamerismus* and *Aegyptobia* in that the female has the hysterosoma subdivided by transverse striae and lacks a ventral plate (a plate bearing the pair of setae located just anterior to the genital plate). It differs from *Phytoptipalpus* principally in that the adult possesses four pairs of legs.

Palpus 5 segmented. Adult with 4 pairs of legs. Rostral shield present, narrow and bifurcate. Body of female elongate-elliptical, the metapodosoma and opisthosoma separated by transverse striae. Integument with fine striae. Propodosoma with 3 pairs of dorsal setae; metapodosoma with 2 transverse rows of 6 dorsal setae each; opisthosoma with a pair of mid-dorsal setae anteriorly and with 5 dorsolateral setae on either side. Female with genital plate present; ventral and anal plates absent; with 3 pairs of anal setae. Male with 4 pairs of genito-anal setae.

The genus *Pseudoleptus* contains a single species.

Pseudoleptus arechavaletae Bruyant

(Figs. 1-3)

Pseudoleptus arechavaletae Bruyant, 1911, Zool. Anz., 38: 340. Cotypes: larvae, nymphs, males, and females, Uruguay, on *Distichlis scoparia;* possibly at the University of Lille, France.

Tenuipalpus haumani Lahille, 1927, Rev. Univ. Buenos Aires (ser. 2), 24: 1295. Cotypes: females, Argentina, on *Distichlis spicata;* possibly at the University of Buenos Aires. New synonymy.

Female—Rostrum reaching to end of femur I. Palpus with two setae and a sensory peg on distal segment. Legs I and II with the femora, genua, and tibiae each with the dorsal seta slender and somewhat longer than width of segment; tarsi I and II each with a sensory peg, posterodistally; tarsi III and IV without sensory pegs; claw with hook absent. Rostral shield strongly bifurcate, the lobes narrow and divergent and reaching the distal end of trochanter I. Propodosoma dorsally with longitudinal, solid striations; dorsal propodosomals setiform and minutely serrate, the anterior pair about one-half as long as distance between them. Metapodosoma dorsally nearly smooth except for transverse striae of strictures anteriorly and posteriorly; dorsal metapodosomals similar to dorsal propodosomals but smaller. Opisthosoma dorsally with caudolaterally diverging, solid striae; dorsolateral opisthosomals five in number, the third and fourth considerably longer than the first, second, and fifth. Podosoma ventrally with solid, longitudinal striae in intercoxal areas, with transverse, dotted striae in wide median area; anterior and posterior pairs of medioventral metapodosomals very short. Opisthosoma ventrally with transverse, dotted striae anteriorly and with semilongitudinal, solid striae laterally and posteriorly; genital plate smooth, with 2 pairs of setae. Length of body 290 *u*, including rostrum 343 *u*; greatest width of body 166 *u*.

Male.—Tarsi I and II each with a single sensory peg as in female. Rostral shield reaching to middle of trochanter I. Propodosoma dorsally similar to female. Metapodosoma dorsally with semilongitudinal, solid striae; opisthosoma dorsally with transverse striae anteriorly and semi-longitudinal, solid striae behind dorsocentrals. Podosoma ventrally similar to female.

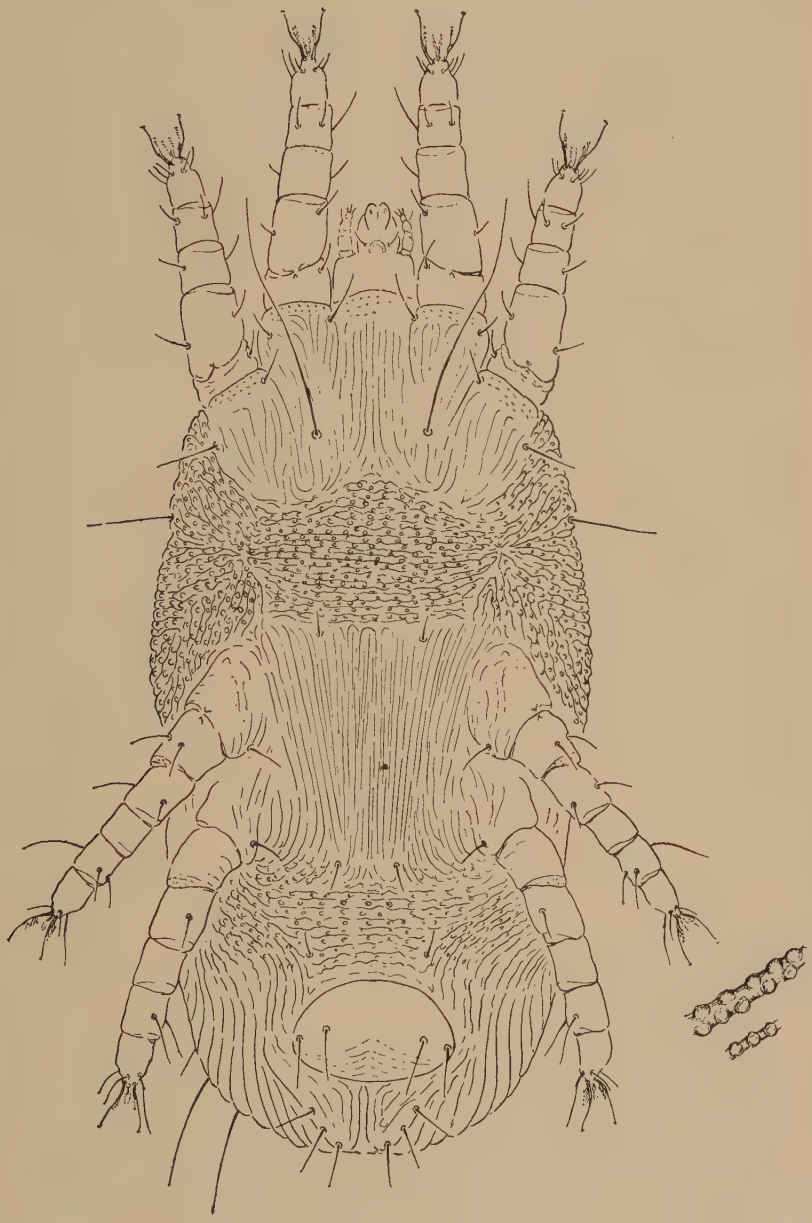

Fig. 2. *Pseudoleptus arechavaletae*, female, ventral aspect.

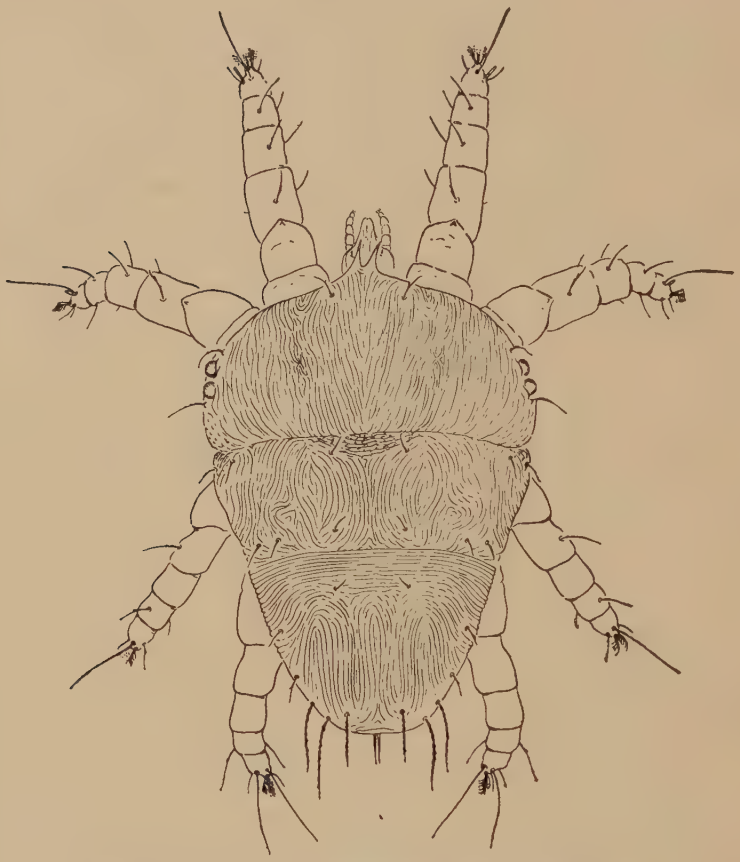

Fig. 3. *Pseudoleptus arechavaletae,* male, dorsal aspect.

Opisthosoma ventrally with transverse, dotted striae; medioventrals located near middle. Length of body 223 *u*, including rostrum 266 *u*, greatest width of body 133 *u*.

Specimens examined are from Canelon Chico, Canelones, Uruguay, April 4, 1910 (from C. S. Carbonell), on *Distichlis scoparia.*

The figures of *Tenuipalpus haumani* that were presented with the original description clearly indicate that this species belongs to the genus *Pseudoleptus. Haumani* was described without reference to *arechavaletae,* and no characters were given to separate the two species. The similarity of the geographic location and hosts indicates that they are synonymous.

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THE ALOE APHID, ALOEPHAGUS MYERSI ESSIC

(Homoptera)

E. O. Essig

University of California, Berkeley

The apterous form of this very interesting introduced aphid was described in the Pan-Pacific Entomologist, Vol. XXVI, No. 1, pp. 22–24, Figs. 1–2, 1950. At the time the original specimens were collected no alate individuals were available. Fortunately, Mr. L. E. Myers, for whom the species was named, recently sent me a considerable number of both alate and winged forms collected on *Aloe* at La Cañada, Los Angeles County, California on February 8, 1951 by W. D. Dyer. A description of the alate forms and an illustration of the same follow.

Alate viviparous parthenogenetic female (fig. 1). Color mostly black excepting the abdomen which is dull greenish with black markings as shown

in the drawing. Short rounded tubercles occur on the head, prothorax and abdomen. A series of wax glands are arranged in transverse groups on the dorsum of the metathorax and the three basal abdominal segments. Small hairs and setae are also present. Antenna 5-segmented with large irregular secondary dorsal sensoria on segments III and IV. These sensoria may be separated or fused. A single large sensorium on IV, as shown, is the rule but it may be divided (in one case) or there may be a large one and a very small one basad (one example). Lengths of segments: III, 0.11 mm.; IV, 0.70 mm.; V, 0.15 mm. The unguis about one-third the length of the base (this also holds for the apterous form in the original description which was erroneously indicated as being twice as long as the base.) Compound eyes and ocelli well developed. The rostrum long and slender and extending beyond the middle of the abdomen, the apical segments only slightly wider than the stem. Prothorax with 4 basal tubercles. Wings with veins and stigma black; venation as illustrated. Abdomen with many lateral and dorsal tubercles and with transverse glandular and pigmented bands. Cauda triangular with many short, curved spine-like hairs. Cornicles absent. Length of body 2.30 mm.; length of forewing 2.97 mm. (Length of apterae 2.20 mm.)

The collection consists of 16 alate and 18 immature and mature apterous forms. The alates are designated as plesiotypes (specimens figured or described as examples of an already named species).

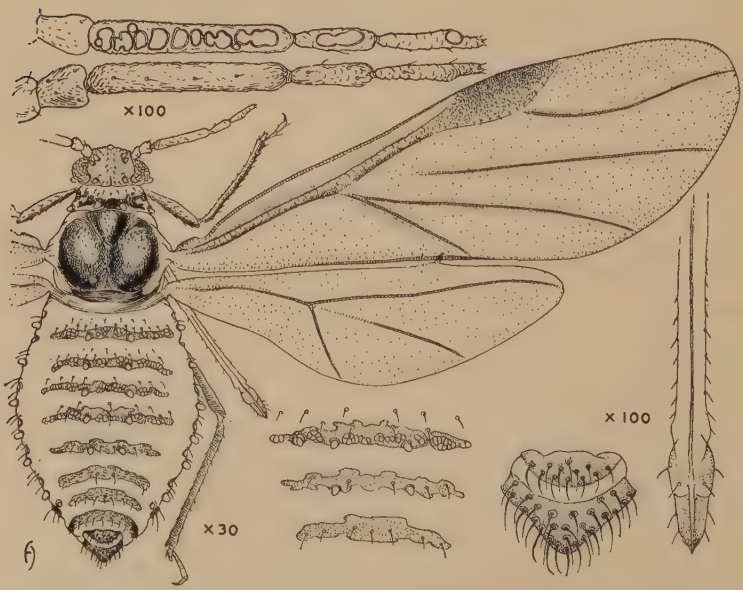

Fig. 1. *Aloephagus myersi* Essig. Alate form (plesiotype) with greatly enlarged antenna, showing dorsal and ventral surfaces; abdominal pigmented, tubercular and glandular areas; anal plate and cauda (ventral aspect); and apical portion of rostrum. (Drawing by Frieda Abernathy).

NOTES ON NEOTROPICAL ARADIDAE, WITH DESCRIPTION OF ONE NEW SPECIES

(Hemiptera)

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Instituto Nacional de Investigacion de las Ciencias Naturales y Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina

I recently had the opportunity to examine the following rare and curious Aradidae from the Neotropical Region which seem worthy of note.

1. *Calisiopsis ampliceps* Champion, 1898, ♀, Porto Alegre, Brazil, R. P. Buck collector, July 11, 1949. This genus with a single species was described by Champion based on three specimens, two ♀♀ from Bugaba and one from Tolé was somewhat aberrant. The specimen from Brazil agrees with the original description. The genus is new for Brazil, and it is most interesting to note this extension in range from Panamá to southeastern Brazil.

2. *Miorrhynchus longipes* Champion, 1898, ♂, Buena Vista, Santa Cruz, Bolivia, A. Martinez collector, February, 1950. This monotypic genus was described by Champion from a single ♀ specimen from Vulcan de Chiriqui, Panamá. The genus is new for Bolivia. The specimen from Bolivia differs somewhat from the original description and drawings of Champion, the size being slightly smaller, 7.3 mm. (Champion gives the size of his type as 7.0 mm. but Dr. R. L. Usinger, who has recently studied the type, informs me that the size is 7.5 mm.); the fourth antennal segment is slightly longer than in the type of *longipes*, the proportion of antennal segments one to four being: 1:0.46:1.07:0.43 (1:0.47:1.06:0.32 in *longipes* according to the original description and to the measurements which were taken from the detailed drawing of Champion); the third and the fourth antennal segments are infuscate but not black at the apex and middle respectively; the genital capsule is as wide as long in the specimen from Bolivia, but Dr. R. L. Usinger informs me that it is slightly longer than wide in Champion's type. Since these differences fall within the limits of possible individual variation, I consider the Bolivian specimen as *Miorrhynchus longipes* Champion (Fig. 1.).

In connection with my study of the genus *Miorrhynchus*, Dr. R. L. Usinger kindly suggested that I might describe a new species

which he had from Panamá. It is a pleasure to dedicate this new species to him.

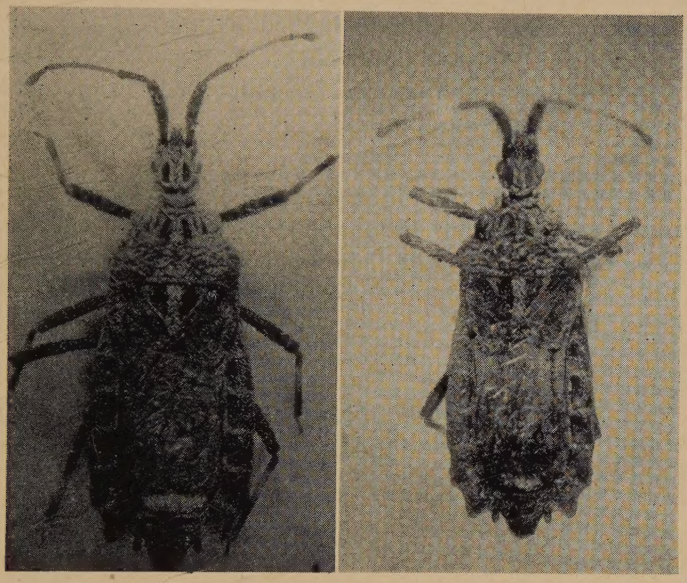
3. **Miorrhynchus usingeri** Kormilev, new species

(Figure 2)

Very similar to *longipes* Champion, but smaller with the general colour more reddish; pronotum somewhat shorter and wider, abdomen shorter and narrower, lateral sutures of the sixth abdominal segment less, and of the seventh more pronounced than in *longipes* from Bolivia(according to Dr. Usinger, Champion's type has the sixth and seventh abdominal segments more strongly produced laterally than in the new species) ; the third antennal joint shorter, the fourth intermediate between that of Champion's type and the specimen from Bolivia.

Reddish brown; basal half of fourth antennal segment and first tarsal segment lighter, the apex of third antennal segment infuscate, tibia with a yellow ring on basal half. Surface partially covered with yellow, truncate, curly hairs. Upper surface mostly and ventral surface almost entirely covered with a yellowish wax-like secretion which is soluble in benzene.

Head subquadrate, longer than wide across eyes (27:21) ; clypeus stout, conical, anteriorly slightly declivous; antenniferous tubercles directed forwards and slightly inwards, exteriorly almost parallel; eyes not very prominent. Yellow curly hairs absent only on antenniferous tubercles, antennae and two longitudinal, callous, infraocular spots on vertex. Antennae long and slender, their length slightly exceeding that of head, pronotum and scutellum together; first segment large, stout, slightly inflated at middle, as long as head; second segment more slender and shorter, both with stout, truncate, bristly hairs on upper surface, more slender on the second segment; third segment most slender, cylindrical, slightly dilated apically, as long as the first segment; fourth segment short, pyriform, with fine long bristles on the apical half. Proportions of antennal segments one to four: 1:0.48:1:0.37. Rostrum short, yellowish and lying in channel formed by bucculae. *Pronotum* wider than long (53:30), divided into two lobes; anteriorly with a distinct collar. Anterior lobe lower and narrower, with longitudinal elevations laterally and arcuate lateral margin; collar completely and anterior lobe mostly covered with yellow, curly hairs, arranged in longitudinal rows or bordering anterior and lateral margins of lobe. Curly hairs absent only on four (or six?) longitudinal callous spots. Posterior lobe plane, with slightly raised lateral angles and covered with scattered granulation and yellow curly hairs. *Scutellum* triangular, wider than long (28:18), flat, basally inflated and with broad longitudinal ridge; the latter entirely and lateral margins of scutellum basally covered with curly hairs. *Hemelytra* reaching hind margin of tergum, leaving the connexivum exposed. Corium exceeding front margin of second segment of connexivum; membrane white, hyaline. Lateral margin of corium



Neotropical Aradidae—Fig. 1. *Miorrhynchus longipes* Champion, ♂; Fig. 2. *M. usinger* Kormilev, ♂.

and broad triangle on disc bordered with curly hairs. *Abdomen* regularly dilated to fifth segment: the sixth segment only slightly and the seventh more strongly sinuate laterally. First segment of connexivum with one and the others with two round yellow spots on each segment. Lateral border of tergum, segments of connexivum partially and especially genital capsul (♂) covered with yellow curly hairs. Genital capsule large, conical, a little wider than long (19:17). Ventral surface of abdomen densely covered with a wax like secretion; secretion absent only on callous spots arranged in longitudinal rows, the median row with spots bigger and oval, the three lateral rows (on each side) with spots smaller and round. *Prosternum* with curly hairs located laterad of a very fine and inconspicuous median sulcus; meso- and metasterna plane, somewhat depressed in the middle. Propleura densely and mesopleura scarcely covered with similar hairs. *Femora* regularly dilated towards apex and covered with numerous rows of setigerous tubercles; setae stout, truncate, yellowish and semi-erect. Tibiae with finer and smaller bristles. Total length, 6.8 mm., pronotal width, 2.1 mm. and width of abdomen, 2.5 mm.

Holotype: ♂, PANAMA CANAL ZONE, BARRO COLORADO ISLAND, N. Banks collector, July 23, 1924, deposited in the collection of the

Museum of Comparative Zoölogy, Harvard University.

4. *Aphleboderrhis pilosa* Stål, 1860, 11 ♂♂, 14 ♀♀ and 1 nymph, Siambon, Tucumán, Argentina, J. M. Bosq, collector, July, 1933; 4 ♂♂ and 5 ♀♀, Tucumán, Argentina, Dr. P. Wygodzinsky collector, Sept. 24, 1949.

RESUMEN

El autor menciona neuvas procedencias de varios géneros de Aradidae neotropicales y describe una especie nueva del género *Miorrhynchus* Champion de Panamá, dedicandola al Dr. Robert L. Usinger, Professor Asociado de la Universidad de California, Berkeley, USA.

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NEOTROPICAL SCOLYTOIDEA V.-119. CONTRIBUTION TO THE MORPHOLOGY AND TAXONOMY OF THE SCOLYTOIDEA

KARL E. SCHEDL

Lienz, Austria

Mr. Hugh B. Leech of the California Academy of Sciences has sent to me two larger lots of bark and ambrosia beetles collected in various parts of the world. Going over the results of the determinations made it seems worth while to provide a list of the species originating from Lower California, Mexico and other parts of America including the description of one new species. Records of species found outside from the America continent will be published elsewhere.

NEW RECORDS

Renocis parkinsoniae Blackman—Lower California: 25 miles S. Santa Rosalia, VII-25-1938, Michelbacher & Ross collectors.

Coccotrypes dactyliperda Fabricius — Lower California: Comondu, VII-22. 1939, Michelbacher & Ross collectors.

Dendroctonus mexicanus Hopkins—Mexico: 15 miles S. El Guardia Distrito Federal. XI-14-1946, E. S. Ross collector.

Plesiophthorus luteolus Schedl—Lower California: Triunfo, VII-13-1938; 15 miles W. La Paz, VII-5-1938, both Michelbacher & Ross collectors; Gulf of California: Angeles Bay, June 27, 1921, J. C. Chamberlin collector.

Plesiophthorus californicus Schedl—Gulf of California: Angeles Bay, June 27, 1921, J. C. Chamberlin collector.

Xyleborus badius Eichh. Mexico: Tamazunchale, San Luis Potosi, XI-23-1946, E. S. Ross collector.

Xyleborus torquatus Eichh.—Mexico: Tamazunchale, San Luis Potosi, XI-1946, E. S. Ross collector.

Xyleborus vagabundus Schedl—Lower California: 15 miles W. La Paz, VII-5-1938; 20 miles N.W. La Paz, VII-16-1938; Todos Santos, VII-15-1938; 8 miles N.E. Cape San Lucas, VII-10-1938, all Michelbacher & Ross collectors.

Xyleborus scopulorum Hopkins—Mexico: 15 miles S. El Guarda Distrito Federal, XI-14-1946, E. S. Ross collector. Lower California: Todos Santos, VII-15-1938; 5 miles S. Miraflores, VII-10-1938; 20 miles N.W. La Paz, VII-16-1938, all Michelbacher & Ross collectors.

Xyleborus volvulus Fabricius—Lower California: 15 miles W. La Paz, VII-5-1938; 20 miles N.W. La Paz, VII-16-1938; 5 miles S. Miraflores, VII-10-1938; Todos Santos, VII-15-1938, all Michelbacher & Ross collectors.

Platypus sulcatus Chapin — Argentina: Prov. Salta, Tablillas, IX-1933 to II-1934; Prov. Salta, Macueta, X-XI-1933, both W. C. Harrington collector.

Platypus inacessus Schedl—Mexico: 15 miles N. Tamazunchale, San Luis Potosi, XI-24-1946, E. S. Ross collector.

Platypus ustulatus Chapin—Mexico: Veracruz, Dr. A. Fenyes.

Platypus ratzeburgi Chapin—Puerto Rico, Consumo Mayayuez, ex *Inga vera* killed by mal de goma, George N. Wolcott collector

Platypus pulicarius Chapin—Argentina: Tartagal, Prov. Salta, W. C. Harrington collector.

Platypus rugulosus Chapin — Mexico: Cordoba, Veracruz, Dr. A. Fenyes; Oaxaca, Zaachila, 4500 ft., VII-21-1937, M. A. Embury collector; 15 miles S. Iguala, Guerrero, XI-15-1946, E. C. Van Dyke; 15 miles N. Tamazunchale, San Luis Potosi, XI-24-1946, E. S. Ross collector. Bolivia: Rurrenebaque, VIII-1925, G. L. Harrington. Argentina: Prov. Salta, Tablillas, XII-1932 to IX-1933, W. C. Harrington.

Platypus punctulatus Chapin—Panama: ex-bananas, IX-8-1932. Canal Zone: Ft. Clayton, VII-10-1945, K. E. Frick; Barro Colorado I., VII-21-1944, K. E. Frick; Argentina: Prov. Salta, Gen. Ballivian, III-IV-1927, G. L. Harrington.

Tesserocerus dewalkei Chapin—Argentina: Prov. Salta, Tablillas, IX-1933 to II-1934, W. C. Harrington collector.

Tesserocerus dejeani Chapin—Mexico: Veracruz, Dr. A. Fenyes.

Plesiophthorus californicus Schedl, new species

Dark reddish brown when fully mature, 1.9 to 2.1 mm long, 2.6 times as long as wide. More closely allied to *Plesiophthorus perspectus* Schedl and of similar size but the pronotum and elytra

more coarsely sculptured, the elytral striae more strongly impressed, the elytral declivity with the lateral convexities somewhat more pronounced and the space between more distinctly aplanate.

Front broad, coarsely sculptured, densely punctured to granulate-punctate, with an irregular shallow median impression and a slight indication of a short transverse carina above; pubescence inconspicuous and short. Antennae and front leg with all typical characters of the genus. *Pronotum* somewhat longer than wide (27.0 : 24.4), posterolateral angles rectangular and distinctly rounded, sides parallel to somewhat beyond the middle, thence obliquely incurved to the rather narrowly rounded apex, the anterior construction merely indicated, anterior margin with several low asperities, summit somewhat in front of the middle, a transverse despression behind; anterior area very densely but rather finely asperate, basal area very densely granulate-punctate; pubescence short. Scutellum moderate in size, somewhat longer than wide. *Elytra* as wide and 1.4 times as long as the pronotum, sides parallel to far beyond the middle, apex very broadly rounded, the postero-lateral angles well developed (much better than in its next relative *Plesiophthorus perspectus* Schedl), cylindrical, declivity short, steeply oblique, with the suture but feebly raised below; disc with regular rows of coarse, very densely placed punctures in somewhat impressed lines, the interstices narrow, more narrow than the striae, each with a row of much smaller punctures; declivity with the strial punctures smaller, the striae themselves much deeper, the interstices comparatively wider and the interstitial punctures more distinct and much more closely placed; the pubescence dense and short originating from both series of punctures, those of the striae and that of the interstices.

Holotype and *paratypes from* ANGELES BAY, GULF OF CALIFORNIA, June 27, 1921, J. C. Chamberlin collector; holotype and some paratypes deposited in the collections of the California Academy of Sciences. Additional paratypes are in the collection of the writer.

The size and even the proportion do vary to some extent in the seven specimens before me but I can not find any distinct sexual differences. Perhaps the more slender specimens are females, the stouter ones males.